

AUG 20 1898

VIII. *Amphipoda from the Copenhagen Museum and other Sources.*—Part II.  
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(Plates 30-35.)

Read 3rd November, 1898.

## INTRODUCTORY REMARKS.

NO panegyrist of the Amphipoda has yet been able to evoke anything like popular enthusiasm in their favour. To the generality of observers they are only not repellent because the glance which falls upon them is unarrested, ignores them, is unconscious of their presence. The majority of the species keep themselves effectively concealed from all but pertinacious intruders, beneath stones and weeds and varying depths of water.

Of the families to be dealt with in these pages the first is the Orchestiidae, or, as some might prefer to call it from the genus first described, the Talitridae. This is of all the Amphipoda the family which has made the strongest effort to place itself in evidence and to overcome the disregard of a neglectful world. More than any of the tribe it has invaded the land, so that its representatives may be found, not only in the sand-hillocks above high-water mark, but in gardens, in woods far from the sea, on hills, in craters of extinct volcanoes. It has climbed higher than any of the Crustacea except a few woodlice, some of the freshwater forms having been taken by Mr. Whymper at a height of more than thirteen thousand feet in the Great Andes. Another mark of distinction may be found in the excessive trouble which nature and art have enabled it to give to the systematist. Not only are the descriptions and figures bequeathed to us by eminent naturalists and artists full of puzzles, but the creatures themselves have conspired in various ways to make the path of knowledge thorny and fatiguing.

Genera, the species of which have different habits, and which are separated by the unlikeness of the males, are in the females scarcely distinguishable (*Talitrus* and *Orchestia*). Genera which have been put apart by a decisive character provokingly join hands just when their separation is most needed. A great increase in the number of known species brings to light the missing links, which, as every one knows, are the curse of classification (*Orchestia* and *Talorchestia*).

Characters which at one time distinguished large groups, or were valid for the whole family, are gradually nibbled away by exceptions here and exceptions there till all the neatness and completeness of the arrangement they provided are muddled away and spoiled. For example, it can no longer be stated with precision that the Orchestiidae always have the first antennae shorter than the second, and the third uropods with never more than a single branch. It is safer to say in the one case almost always and in the

other hardly ever. The clear division of the family into two groups by the palp of the maxillipeds is brought to nought. It is still true that there are some of the genera in which the joints of the palp in question are four, and others in which they are only three, but forms are now known in which they are not properly either three or four, but rather three and a fraction (*Parorchestia*).

The anomalous family of the Phliadidæ, with which this paper is next concerned, was introduced to scientific notice by that great pioneer in the zoology of the coast-line, Colonel Montagu. It was probably at Salcombe, in South Devon, that he found the typical species. To this he gave the name of *Oniscus testudo*, indicating by the generic name that he made the not unnatural mistake of supposing it to be an isopod. Some of its since found congeners have an even more striking likeness to some of the Isopoda. All the Serolidæ are broad and flat, but in them the tortoise-like and chiton-like appearance is generally impaired by projecting appendages. On the other hand, a New Zealand isopod genus, *Plakarthurium* Chilton, subsequently again described from South Georgia by Pfeffer under the name *Chelonidium*, has a facies with which that of some of the Phliadidæ is exactly comparable. Montagu's species has been found in the Mediterranean, and now a first cousin of it comes to us from Australia. From Australia and New Zealand together we are supplied, as will be shown, with four species of this family so remarkably alike in general appearance and in many conspicuous details of structure that one might readily take them for conspecific varieties. Minuter study brings to light the curious circumstance that they are not only specifically distinct, but that they are separated one from another by characters of generic value.

After one or two notes on the family Melphidippidæ, the paper concludes with the definitions of several new genera within the family of the Gammaridæ. The genus *Gammarus* may be regarded as antediluvian, because, since its institution by Fabricius in 1775, a whole flood of genera has issued from it. With successive restrictions it still remained unwieldy. The researches of Dybowsky in Lake Baikal added a hundred and fifteen species within the compass of a single treatise. Some of the Lake Baikal forms differ so strikingly that it requires either a very lax or a very lofty standard of generic value to allow the comprehension of their varied characteristics within a single genus. It is useless to apologize for the institution of new genera. Their fate not uncommonly is at first to be abused as needless, inconvenient, and ill-constructed. Attempts are sometimes made to ignore them and set them aside. Then, as time goes on, they are found to be necessary, they are recognized, and pass into circulation as current coin of the scientific realm.

The redistribution of species of Gammaridæ here offered would more naturally, as it seems to me, have appeared in that general account of the Amphipoda which is being prepared for 'Das Tierreich.' But the organizers of that vast scheme of zoological publication have passed a self-denying ordinance. Novelty is excluded. There are to be no surprises. The contributor is not to expand the sum of knowledge, but to condense it. From one point of view this is a wise and considerate arrangement, but it has a drawback. In surveying any large group of the animal kingdom, especially among

invertebrates, a reporter can scarcely pursue his studies very far without finding that there are new forms to be described, new names to be applied, new items of classification to be introduced. For all these the rule above mentioned requires double publication, and this, unlike the quality of merey, which blesses him that gives and him that takes, is an almost unmitigated nuisance to the writer and the reader.

It now remains for me to express my hearty thanks to Dr. Meinert and his colleagues at the Copenhagen Museum, and especially to Dr. H. J. Hansen, for entrusting me with the fine collection of Orchestiidae under their charge. To the Trustees of the Australian Museum, Sydney, I am indebted for 'co-types' of some of Professor Haswell's species sent me through the obliging intervention of Mr. R. Etheridge and Mr. Thomas Whitelegge. From America specimens of great service to my work have been sent me by Mr. James Benedict, of the National Museum, Washington; by Mr. S. J. Holmes, of the University of California; and by Mr. C. F. Baker, of the Alabama Polytechnic Institute. To Professor Möbius I owe my thanks for examples of several of the Lake Baikal Gammarids. Mediterranean specimens received from my friends M. Ed. Chevreux and Signor Della Valle have thrown light on various obscure parts of the subject. Lastly, I must refer to the special kindness of Professor Haswell, F.R.S., and Mr. Thomas Whitelegge, who have sent me miscellaneous gatherings of Australian Amphipoda, enabling me to dredge for southern rarities under the shelter of my own roof in the peaceful shallows of a watch-glass.

### Fam. ORCHESTIIDÆ.

#### *Synoptic View of the Genera.*

- |    |   |  |                                       |
|----|---|--|---------------------------------------|
| 1. | { | Maxillipeds, fourth joint of palp wanting or quite rudimentary, 2. |                                       |
|    | { | Maxillipeds, fourth joint of palp distinct, 5.                     |                                       |
| 2. | { | First gnathopods simple in the male, 3.                            |                                       |
|    | { | First gnathopods subchelate in the male, 4.                        |                                       |
| 3. | { | Second gnathopods feebly chelate in the male . . . . .             | 1. <i>Talitrus</i> Latreille, 1802.   |
|    | { | Second gnathopods strongly subchelate in the male . . . . .        | 2. <i>Orchestoidea</i> Nicolet, 1849. |
| 4. | { | First gnathopods subchelate in the female . . . . .                | 3. <i>Orchestia</i> Leach, 1814.      |
|    | { | First gnathopods simple in the female . . . . .                    | 4. <i>Talorchestia</i> Dana, 1852.    |
| 5. | { | Third uropods single-jointed, 6.                                   |                                       |
|    | { | Third uropods not single-jointed, 7.                               |                                       |
| 6. | { | Telson partially cleft . . . . .                                   | 5. <i>Ceina</i> Della Valle, 1893.    |
|    | { | Telson entire . . . . .  | 6. <i>Chiltonia</i> , n. g.           |
| 7. | { | Third uropods with two rami, 8.                                    |                                       |
|    | { | Third uropods with only one ramus, 9.                              |                                       |
| 8. | { | Telson divided . . . . .   | 7. <i>Parhyale</i> Stebbing, 1897.    |
|    | { | Telson entire . . . . .  | 8. <i>Neobule</i> Haswell, 1880.      |
| 9. | { | Maxillipeds, fourth joint of palp not unguiform . . . . .          | 9. <i>Parorchestia</i> , n. g.        |
|    | { | Maxillipeds, fourth joint of palp unguiform, 10.                   |                                       |

10. { Second gnathopods of the male, fifth joint not produced between  
the fourth and the sixth . . . . . 10. *Hyale* Rathke, 1837.  
Second gnathopods of the male, fifth joint produced between the  
fourth and the sixth, 11.
11. { Telson undivided . . . . . 11. *Hyalella* S. I. Smith, 1875.  
Telson more or less divided . . . . . 12. *Allorchestes* Dana, 1849.

TALORCHESTIA TRIDENTATA, n. sp. (Plate 30 B.)

The back is not very broad. The first four pairs of side-plates are scabrous, the first shallower than the three following; the fifth is the widest. The eyes are roughly oval, rather more than their longer diameter apart.

*First antennæ.* Very small, not reaching the middle of the penultimate joint of the peduncle of the second antennæ.

*Second antennæ.* About one-third as long as the body; the last joint of the peduncle twice as long as the penultimate; the flagellum scarcely as long as the peduncle, flattened, slightly tapering, consisting of about twenty-four short transverse joints.

*First gnathopods.* Spinose, the fifth joint long, the subapical pellucid process of the hind margin narrow, very prominent; the sixth joint much shorter, rather narrow, the apical pellucid process prominent, the finger with sinuous inner margin, extending beyond the apical process of the sixth joint.

*Second gnathopods.* The second joint is channelled in front, the apices of the front margins being faintly lobed; the third joint is rather larger than the fourth, neither of them longer than broad; the fifth joint is exceedingly diminutive; the sixth very large, its hind margin fringed with spinules, the palm oblique, having near the finger-hinge a large triangular spinulose tooth, followed by a sinuous slope, and defined from the hind margin by two teeth side by side, only one of them being visible in a profile view; the finger very large, with swelling of the inner margin near the hinge; the rest of the margin concave, fringed with small spinules.

*Second pereopods.* This pair is much shorter than the first. The finger has a strong prominence near the base of the nail.

*Third pereopods.* This pair is very short, the second joint nearly as broad as long.

*Fourth and fifth pereopods.* These pairs are not very elongate, but much longer than the third pair. All the pereopods are spinose, with rather small branchial vesicles.

*First uropods.* Long, the rami much shorter than the peduncle, both carrying marginal spines.

*Second uropods.* The rami are not shorter than the peduncle, with stout spines.

*Third uropods.* The ramus is at least as long as the peduncle.

*Telson.* Short, spinulose.

*Length.* Less than half an inch, 11 mm.

*Hab.* California. The specimen described, a male, was sent me by S. J. Holmes, Esq., among specimens of *Orchestia traskiana*.

Without knowledge of the other sex this species can only conjecturally be assigned to



*Talorchestia*. But it shows considerable likeness to another member of that genus, *Talorchestia pravidactyla* Haswell, while also the sharply notched finger of the second peræopods and the long fifth joint of the first gnathopods are more commonly associated with *Talorchestia* than with *Orchestia*. The specific name alludes to the three-toothed palm of the second gnathopods.

TALORCHESTIA NOVE-HOLLANDIÆ, n. sp. (Plate 31 A.)

The body is stout. In the second pleon-segment the postero-lateral corners have an acute point; in the third segment they are quadrate.

*Eyes* round, dark, about their diameter apart.

*First antennæ*. They reach beyond the penultimate joint of the peduncle of the second antennæ; the joints of the peduncle are successively shorter, none of them elongate; the flagellum is shorter than the peduncle and consists of six joints.

*Second antennæ*. Verticillately spinulose, about one-third as long as the body, penultimate joint of the peduncle nearly four-fifths as long as the ultimate; the flagellum is rather shorter than the peduncle, and is composed of nineteen rather short joints.

*First gnathopods*. ♂. The second joint bulges considerably from the narrow neck and then narrows again slightly; the fifth joint is longer than the sixth, and has a prominent but narrow apical process of the hind margin; the sixth joint is rather short, much widened distally, the finger overlapping the true palm, but not the advanced rounded process of the hind margin, against which its apex impinges.

*Second gnathopods*. ♂. The second joint is comparatively narrow, the third rather larger than the fourth, the fifth diminutive; the sixth very large, slightly widening to the almost transverse palm, which, as so often occurs, has at the defining angle a small pocket, a broad convexity leading thence to a spinulose concave space near the finger-hinge, over which space the finger arches, leaving an interval, the convexity of its sinuous margin then touching the convexity of the palm and its apex passing into the defining pocket.

*First gnathopods*. ♀. The fifth joint has no apical process of the hind margin; the sixth is short, strongly spined, narrowing gradually to the short finger, the base of which occupies its rounded apex.

*Second gnathopods*. ♀. The second joint is membranous, well expanded; the sixth joint nearly as long as the fifth, rather narrow, produced as usual beyond the minute palm, to which the finger is adjusted in a rather oblique position.

*Second peræopods*. The finger is sharply notched near the nail.

*Third peræopods*. These are short, with the broadly expanded second joint almost as broad as long.

*Fourth peræopods*. Much longer than the third pair.

*Fifth peræopods*. These are longer than the fourth pair, and have the second joint broader, with subquadrate apex to its hind margin; the fourth and fifth joints rather broad, but at the same time elongate; the sixth joint long and narrow. All the peræopods have numerous spines on both margins.

*Uropods.* These all have marginal spines on the peduncles and rami.

*Third uropods.* The ramus is slender, shorter than the peduncle.

*Telson.* This is peculiar, much longer than broad, composed of separate halves, which appear to fold closely together, each carrying two apical spinules and two well-separated marginal spines.

*Colour.* Dusky in spirit.

*Length.* About two-fifths of an inch, 10 mm.

*Hab.* Australia, Manly Beach. Two specimens were forwarded to me by Mr. Thomas Whitelegge, of the Australian Museum, with the label, "*Talorchestia noræ-hollandiæ*. H. Manly Beach." The specimens were ♂ and ♀.

TALORCHESTIA DESHAYESII (Audouin). (Plate 30 A.)

1825. *Orchestia Deshayesii* Audouin, Explication des Planches de Savigny, Atlas, pl. 11. fig. 8.

1893. *Talorchestia Deshayesi* Chevreux, Bulletin de la Société Zoologique de France, vol. xviii. p. 127, fig. in text.

For the remainder of the synonymy of this well-known species reference may be made to the 'Challenger' Amphipoda and Della Valle's Gammarini. The specimen here figured is a young male. It exhibits a form of the second gnathopod closely agreeing with that which Barrois has figured as belonging to an individual with eighteen joints in the flagellum of the second antennæ. The individual here figured has that precise number of joints in the flagellum. Professor Th. Barrois was the first to call attention to the transformations through which the second gnathopod passes in the male of this species. It begins with a feebly chelate form. Gradually the palm becomes transversely excavate and defined by a blunt double tooth. The tooth becomes single, the palm becomes oblique, and finally in the adult stage there is an acute tooth, which, so far from chelately overlapping a small finger, has shrunk back to the very base of the hand, and a very long finger curves to meet it over a long straight extremely oblique palm.

The specimen was obtained for the Copenhagen Museum from Constantin, in Algeria, by Dr. Meinert.

I have a specimen with the adult form of the gnathopod on one side, and on the other the juvenile, the latter no doubt representing a limb that has been lost by some accident.

M. Ed. Chevreux was the first to show that in the female the first gnathopod is simple, so that the species is more properly referred to *Talorchestia* than to *Orchestia*.

The species is frequently to be met with on the sandy shores of North Devon. Its European distribution is very extended.

ORCHESTIA SULENSONI, n. sp. (Plate 30 C.)

The integument, as preserved in spirit, is membranaceous and iridescent. The third and fourth pairs of side-plates are little deeper than the fifth and sixth. The third pleon-segment has the postero-lateral corners quadrate, the point scarcely produced.

*Eyes* not very large.

*First antennæ.* The first joint is very small, at least as broad as long; the second and third joints are each slightly longer; the flagellum consists of four joints, together about as long as the third joint of the peduncle.

*Second antennæ.* The peduncle is large and stout, its penultimate joint about three-fourths as long as the ultimate, and not stouter. The flagellum is shorter than the peduncle, and on one side of the specimen contained twenty-one joints, on the other side eighteen.

*First gnathopods.* The second joint is narrow at the base, and then becomes rather broad; the fourth has no apical process; the fifth widens to a distal, pellucid, prominent but narrowly rounded process of the hind margin; the sixth joint, which is two-thirds the length of the fifth, is oblong, widening very slightly to the palm, which has no conspicuous process, and is overlapped by the small unguiculate finger. Both the fifth and sixth joints are beset with a moderate armature of spinules.

*Second gnathopods.* The second joint is not very wide, though for most of its length much wider than at the base. The third and fourth joints are very small, but larger than the almost evanescent fifth. The sixth joint is very large, fringed with spinules on the hind margin, widening to the palm, which is moderately oblique, spinulose, smoothly convex between a blunt defining tooth and a deep depression near the finger-hinge, the depression corresponding with a rounded process of the finger's inner margin; the large curved finger matches the palm.

*First and second pereopods.* These are slender, the first pair conspicuously longer than the second, the short finger of the second having, as usual in the genus, its inner margin indented.

*Third, fourth, and fifth pereopods.* Of these the third is much smaller than either of the others. In all the second joint is oval, but in the fifth pair, in which it is largest, the oval is modified by the comparative straightness of the hind margin. In the fourth and fifth pairs the joints following the third are rather long and narrow.

*First uropods.* The upper ramus has lateral as well as apical spines, and is rather shorter than the lower ramus, which has only apical spines.

*Second uropods.* The rami are equal, and both have lateral spines.

*Third uropods.* The ramus is not half as long or half as broad as the peduncle. It is armed with a row of three spinules.

*Length* two-fifths of an inch, 10 mm. From the size of the second gnathopods and powerful second antennæ in the single available specimen it may be inferred to be an adult male. It agrees with the imperfectly described *Orchestia lucurana* of Fritz Müller in regard to the finger and the notched palm of the second gnathopods, but Müller lays stress on the fact that these characters are combined with incrassated fourth and fifth joints of the fifth pereopods in his species, the younger males with slender pereopods having also a smooth palm to the gnathopods and the second antennæ slender.

*Hab.* The specimen, which belongs to the Copenhagen Museum, was labelled "Madeira? Sulenson."

The specific name is given in compliment to the traveller who procured the specimen.

## ORCHESTIA GRILLUS (Bosc).

1802. *Talitrus grillus* Bosc, Histoire Naturelle des Crustacées, vol. ii. p. 152, pl. 15. figs. 1, 2 (called on the plate 'Thalitre terrestre').

It is not necessary here to discuss the synonymy of this species, which nearly resembles *Orchestia gammarellus* (Pallas). It is only mentioned for the sake of recording an abnormality in a male specimen belonging to the Copenhagen Museum. The second peræopod on the right side has been cicatrized near the base of the fourth joint, but attached to the same side-plate that carries the damaged limb is a limb with the full number of joints, though these are less strongly developed than those of the limb on the left side or than the remaining joints of the broken limb.

*Hab.* The specimen is labelled "New York Omegn, L. Lund," meaning that it was obtained by L. Lund in the neighbourhood of New York.

## PARORCHESTIA, n. g.

Like *Orchestia*, except that the maxillipeds have a fourth joint to the palp, distinct, though small, conical, and carrying a spine on the truncate apex.

The name is derived from παρά, near, and *Orchestia*. The genus is formed to receive the species (1) *Orchestia tenuis* Dana, with which the *Allorchestes recens* of G. M. Thomson seems to be identical; (2) *Orchestia hawaiiensis* Dana; and (3) *Orchestia sylvicola* Dana.

## HYALE GALATEE, n. sp. (Plate 31 B.)

The species occurs both in the Atlantic and the Pacific, with the slight difference that in the Atlantic specimens the integument appears to be smooth, while in those from the Pacific the back and to some extent the appendages are scabrous, with little hairs or scales like a capital T inverted. The first side-plates are widened below, the second and third pairs are not very deep. The third pleon-segment has the postero-lateral corners quadrate.

*Eyes.* Large, oval, black, nearly meeting at the top of the head.

*First antennæ.* Much longer than the peduncle of the second antennæ; joints of the peduncle small, successively shorter; flagellum in ♂ with nine, in ♀ seven, distally widened joints.

*Second antennæ.* About one-third as long as the body; last joint of the peduncle considerably longer than the penultimate; flagellum of ♂ with twelve to fourteen, of ♀ nine joints.

*First maxillæ.* The palp has a small constriction.

*Maxillipeds.* The curved fourth joint of the palp is slender.

*First gnathopods.* ♂. The second joint is short and broad, with narrow base; the fourth is distally squared; the fifth is as broad as long, with a rounded lobe behind carrying spines along the somewhat flattened hind margin; the sixth joint is rhomboidal, distinguished by a small hump at the centre of the long front margin, the much shorter



concave hind margin making an angle before it joins the oblique spinuliferous palm, from which it is defined by a palmar spine that antagonizes with the apex of the curved finger.

*Second gnathopods.* ♂. The second and third joints are distally lobed in front; the fourth has the apex broadly rounded; the fifth is very short, with the little horny-looking process from the hind margin on either side more conspicuous than usual; the sixth joint is large, widest where the short, smoothly curved, hind margin meets the long, very oblique, nearly straight, spinulose palm, and narrowest at the hinge of the long curved finger, which has a strong bulb at the base of its inner margin.

*First and second gnathopods.* ♀. Small, the fifth joint short, the sixth oblong, slightly widened at the rather oblique, spinulose palm. The second pair are a little the longer.

*Percæopods.* These are moderately robust. The finger has a minute inner setule. In the last three pairs the second joint is broadly oval, nearly smooth on the hind margin, the lower part of the wing in the fifth pair being broadly produced downward.

*First and second uropods.* In both pairs there are lateral as well as apical spines on both rami.

*Third uropods.* The ramus is a little shorter than the peduncle, with spinules at or near the apex.

*Telson.* The lobes have the proximal half of nearly uniform width, the distal half triangular.

*Length.* About one-sixth of an inch, 4 mm.

*Hab.* Pacific and Atlantic. Specimens belonging to the Copenhagen Museum were taken at various localities, at different dates, by several naturalists, as appears from the labels, "‘Galatea,’ 6. S. 46. Rhdt.;" "37° 32' N., 179° 43' E., 15. 3. 46. Reinhardt"; "4° 30' N., 137° E., 8. 11. 75," "Caspersen"; while in the Atlantic one specimen, ♂, was obtained from the Sargasso Sea by "Friis, 1861," and one specimen, ♀, "26° 20' N., 58° 40' W., 6. 2. 96. Chr. Levinsen," the last locality also corresponding with the Sargasso Sea.

#### HYALE DIPLODACTYLUS, n. sp. (Plate 31 C.)

The first and second side-plates are not very deep, and the first are but little widened below.

*Eyes.* Rounded, light-coloured in spirit.

*First antennæ.* Much longer than the peduncle of the second pair; the peduncle is short, the second joint much shorter than the first, and the third than the second; the flagellum in the ♂ has fourteen joints, in the ♀ nine.

*Second antennæ.* The last joint of the peduncle is rather longer than the penultimate; the flagellum in the ♂ has twenty-six joints, in the ♀ seventeen.

*First gnathopods.* ♂. The second joint is rather short, narrow above, broad below; the fourth joint is distally squared, supporting the spinose hind lobe of the fifth joint, which throws out this lobe beyond a short distal piece of its hind margin; the sixth

joint widens greatly to the palm, with the hind margin sinuous, much shorter than the smoothly curved front; the palm long, not very oblique, excavate, ending in a wide pocket, which receives the deeply furcate end of the finger, which is thus wider distally than at its base.

*Second gnathopods.* ♂. These scarcely differ from those of *Hyale Galatæa*, except that the expanded front margin of the second joint is closely fringed with setules, and the sixth is widest near to the base instead of at the junction of the hind margin with the long, very oblique palm.

*Telson.* *In situ* this is rather markedly upturned, with a slight twist to the blunt apex of each triangularly ending lobe. In other respects this species appears in both sexes to agree with *Hyale Galatæa*, except that the size is a little greater.

*Length.* ♂ rather over, ♀ rather under one-fifth of an inch, 5 mm.

*Hab.* St. Croix. The specimens belonging to the Copenhagen Museum were obtained by Oersted in the Danish West Indies.

The specific name refers to the double-ended finger in the first gnathopods of the male.

#### HYALE MACRODACTYLUS, n. sp. (Plate 31 D.)

The side-plates are not deep; the first is distally widened, the fourth is wide, with deep hind emargination. The third pleon-segment has the postero-lateral corners quadrate, the angle scarcely produced.

*Eyes.* Not large, rounded, wider apart than their diameter.

*First antennæ.* The peduncle is short, its first joint subequal to the second and third combined; the flagellum consists of thirteen joints, of which those near the base are short.

*Second antennæ.* More than half as long as the body; the last joint of the peduncle longer than the short penultimate; the flagellum containing twenty-five joints.

*First gnathopods.* ♂. The second joint is short and broad except at the base; the third has a small front lobe; the fourth an acute hind apex; the fifth is lobed much as in *Hyale diplodactylus*; the sixth is oblong oval, the palm oblique, spinulose, separated from the hind margin by a rounded angle carrying a palmar spine, against the inner side of which the apex of the finger closes.

*Second gnathopods.* ♂. The second joint is lobed at the distal end of the front margin; the third is lobed in front; the rounded apex of the fourth touches the base of the sixth; the fifth is small, triangular, with length and breadth subequal; the sixth is elongate, widest at the base, the front margin smoothly convex, the palm closely fringed with slender spinules and extending almost the whole length of the joint, its nearly straight line broken only by a shallow emargination between two slight swellings, one of which is close to the finger-hinge; the long, blunt, slightly sinuous finger can reach the apex of the fourth joint.

*First and second gnathopods.* ♀. The sixth joint is narrowly oblong.

*Peræopods.* In these the sixth joint at the apex of the inner margin carries a strong

blunt spine, with a similar but much shorter one below it; the finger curved, its inner setule minute. In the third and fifth pairs the second joint is somewhat orbicular; in the fourth pair it is oblong oval, rather wider above than below.

*First and second uropods.* Both rami have lateral spines.

*Third uropods.* The ramus is as long as the peduncle.

*Telson.* The lobes are bluntly triangular.

*Length.* About one-sixth of an inch, 4 mm.

*Hab.* St. Thomas's Harbour. The specimens, which belong to the Copenhagen Museum, were obtained in the Danish West Indies by Chr. Levinsen, and reached me mixed with specimens of *Hyale Perieri* (Lucas) and *Hyale media* (Dana).

A specimen in the same collection, from Rio Janeiro, is probably a younger form of the male of this species. It has a flagellum of ten joints to the first, and one of eighteen to the second, antennæ. The first gnathopods are without the strong bulging at the juncture of the palm with the hind margin. The second gnathopods have the long oblique palm smoothly curving and defined from the short hind margin by a small pocket, which the long finger reaches.

#### HYALE MAROUBRE, n. sp. (Plate 32 C.)

Body rather compressed, shining. Third pleon-segment with postero-lateral corners quadrate.

*Eyes.* Roughly rounded, about their diameter apart, moderately dark in spirit.

*First antennæ.* These reach well beyond the peduncle of the second pair. The peduncle is short, the first joint equal to the second and third combined; the flagellum has nine slender joints.

*Second antennæ.* About half the length of the body; the flagellum longer than the peduncle, slender, composed of nineteen joints.

*First gnathopods.* ♂. The fourth, fifth, and sixth joints are subequal in length; the fourth has a produced, broadly-rounded apex, carrying one or two spinules; this apex is separated from the sixth joint by the rounded hind lobe of the fifth, which is fringed with about eight graduated spines; the sixth joint is oblong, but scarcely longer than the width, which is rather greater at the palm than the base; the hind margin from near the base is fringed with spinules which pass round on to the surface and meet a transverse row of small spinules, across which the short finger closes, as though they represented the true course of the palm, but the hinder half of the distal margin of the sixth joint extends beyond these in a microscopically denticulate lobe at right angles to the hind margin, though the junction is rounded off.

*Second gnathopods.* ♂. The second joint is slightly lobed at the front apex, downward, not outward; the third joint has a small outward lobe; the fourth joint is small, a little produced at the hind apex; the fifth is very small, triangular; the sixth very large, oval, broadest proximally, the hind margin very short, the spine-fringed palm very oblique and long, well defined, the long finger nearly reaching the fourth joint, its



apex when closed passing on the inner side of the palmar spine into a pocket on the surface of the sixth joint. The branchial vesicles are very small.

*Peræopods.* These are of medium robustness and the usual relative proportions, but are distinguished by the apical spines of the sixth joint. As in various other species, the large distal spine which antagonizes with the finger is blunt-headed, with the margin partially serrate, but the smaller spine between this and the finger is bent up to meet it, and is not tapering or parallel-sided, but from the neck onward of fusiform appearance, with numerous lines or grooves parallel more or less to the outline; the setule on the inner margin of the finger is extremely small. In the last three pairs the second joint has the hind margin crenulate, but not strongly.

*First uropods.* The rami are as long as the peduncle, and neither of them is devoid of lateral spines.

*Second uropods.* The rami are unequal, longer than the peduncle.

*Third uropods.* The ramus is moderately slender, as long as the peduncle, both with apical spines only.

*Telson.* Cleft to the base, slightly broader than long, the lobes distally somewhat acutely triangular.

*Length.* One-fifth of an inch, 5 mm.

*Hab.* Australia; Maroubra Bay, near Sydney, New South Wales. The specimens occurred in a gathering sent me by Mr. Thomas Whitelegge, "obtained by washing the seaweeds from low tide-line."

By the structure of the first gnathopods and the peculiar spines of the peræopods this species seems to be easily distinguishable from all hitherto described.

#### HYALELLA WARMINGI, n. sp. (Plate 32 A.)

The body is rather robust; the sixth side-plates are deeply lobed behind; the third pleon-segment has the postero-lateral corners a little produced backward, acute.

*Eyes.* Small, dark, wider apart than their diameter.

*First antenna.* The second joint is scarcely shorter than the first, the third a little shorter than the second; the flagellum has thirteen joints in the  $\sigma$ , ten in the  $\varphi$ .

*Second antennæ.* More than half as long as the body, the gland-cone prominent, the last joint of the peduncle a little longer than the penultimate; the flagellum shows nineteen joints in the  $\sigma$ , fifteen in the  $\varphi$ .

*First maxilla.* The palp is minute.

*Maxillipeds.* Third joint of palp distally widened, fourth with curved spine on the blunt apex.

*First gnathopods.*  $\sigma$ . The fifth joint has a subapical group of spines on the front margin, and the bulging hind margin fringed with graduated spines; the sixth joint is shorter, widening, with sinuous hind margin to the transverse palm, which is defined by a process within which the finger closes; there is an oblique row of spinules on the surface.

*Second gnathopods.*  $\varphi$ . The second joint is slender, not lobed below; the fifth short,



the fringed cup-like process well produced; the sixth joint large, oval, the very oblique sinuous palm forming three lobes, of which the centre one is broadest, the finger closing at the third into a pocket which meets the hind margin at a well-defined angle.

*First and second gnathopods.* ♀. These are similar to the first in the ♂, but smaller, and the sixth joint of the second is rather longer and more slender than that of the first.

*Peræopods.* These are tolerably robust and spinose. In the last three pairs the second joint is broadly oval, considerably larger in the fifth than in the two preceding pairs. There are simple accessory branchiæ on the first four pairs of the peræopods.

*First and second uropods.* These have lateral spines on both rami.

*Third uropods.* The ramus is as long as the peduncle.

*Telson.* Squared at the base, then broadly rounded, with two distant setules on the broad apical margin.

*Colour.* Dusky in spirit.

*Length.* A fifth of an inch, 5 mm.

*Hab.* Lagoa Santa, from watercourse. The specimens belong to the Copenhagen Museum, and were obtained by Warming, after whom the species is named. The species seems most nearly related to *Hyalella Lubomirskii* (Wrześniowski), to judge by the description of that species, which is unhappily unaccompanied by figures.

#### HYALELLA MEINERTI, n. sp. (Plate 32 B.)

The first three pairs of side-plates are deeper than broad; the third pleon-segment has the postero-lateral corners acutely quadrate.

*Eyes.* Black, usually wider apart than their diameter.

*First antennæ.* Slender, more than half as long as the second pair; third joint of the peduncle nearly as long as the second, but by its slenderness resembling the joints of the flagellum; flagellum composed of nine or ten elongate joints.

*Second antennæ.* Slender, more than half as long as the body; penultimate joint of peduncle rather long, ultimate still longer, the flagellum consisting of thirteen to fifteen elongate joints.

*First gnathopods.* ♂. The fourth joint has a scabrous, rather prominently rounded apex; the fifth is strongly widened distally, with the projecting apex scabrous and rounded; the sixth joint is much shorter, scarcely widening to the transverse well-defined palm, and, as is so commonly the case in the genus, inclined athwart the preceding joint.

*Second gnathopods.* ♂. The second joint is narrow, the fourth as in the preceding pair; the fifth with the usual cup-like spine-fringed lobe; the sixth much longer than broad, its basal part narrow, rather abruptly widening at the boss which defines the oblique, slightly sinuous palm, the finger closing completely over the palm, with its apex on the surface within the boss.

*First and second gnathopods.* ♀. These are small; the fourth joint has a rounded

apex; the sixth in the first pair is shorter than the fifth, but in the second at least as long, in both narrow, oblong, narrowest at the base, with the short palm transverse or slightly tending to form an acute angle with the hind margin.

*Peræopods.* The fourth pair are rather longer than the third, and the fifth than the fourth. In the third and fourth pairs the second joint is oval, in the fifth pair it is much wider, with flattened front and very convex hind margin. There are accessory branchiæ to all the five pairs. The ordinary branchiæ were not perceived on the fifth pair.

*Uropods.* These are unusually slender. The first and second pairs have lateral spines on both rami. The third pair are comparatively long, the tapering ramus rather longer than the peduncle, and extending considerably beyond the telson.

*Telson.* Oblong oval, with a pair of spinules on the rounded apex.

*Length.* A fifth to a quarter of an inch, 5-6 mm.

*Hab.* Lago di Espino. Specimens belonging to the Copenhagen Museum, obtained by Dr. Meinert, in compliment to whom the species is named.

In regard to the first and second antennæ this species agrees closely with Faxon's "*Allorchestes dentatus*, var. *gracilicornis*," and in other respects with his "*Allorchestes longistilus*"; but for neither of these forms is any mention made of accessory branchiæ, nor do those appendages appear to be present in *Hyaella inermis* S. I. Smith, to which Faxon's species are closely related.

#### CHILTONIA, n. g.

First four pairs of side-plates deep. First and second antennæ equal in length. First maxillæ without palp, although distinctly notched at the palp's usual position. Maxillipeds with the fourth joint of the palp small, conical. Other mouth-parts as in the family character. First and second gnathopods subchelate, the second differing greatly in the two sexes. The third uropods one-jointed. Telson simple.

Name of the genus given in compliment to Dr. Charles Chilton, M.D., D.Sc., F.L.S.

#### CHILTONIA MIHIWAKA (Chilton).

1898. *Hyaella mihiwaka* Chilton, Annals and Magazine of Natural History, ser. 7, vol. i. p. 423, pl. 18.

The typical species has been very accurately described and figured by Dr. Chilton, who has obliged me with specimens. It seems possible that the pear-shaped third uropods may represent a peduncle and ramus coalesced into a single joint.

"*Colour.* Greyish or nearly white.

"*Size.* Largest specimens about one-fifth of an inch (5 mm.).

"*Hab.* Mountain-streams near Port Chalmers, up to about 1500 feet above sea-level (*Chilton*). In hillside stream at East Taieri; from spongy moss at top of Mount Cargill, 2200 feet, and on Swampy Hill, 2400 feet (*G. M. Thomson*)."

*ALLORCHESTES MALLEOLUS*, n. sp. (Plate 33 A.)

The body is moderately compressed. The first four pairs of side-plates are rather deep, without the projecting point of the hind margin found in many of the *Orchestiidae*. The third pleon-segment has the postero-lateral angles bluntly produced.

*Eyes.* Not large, rounded, dark in spirit, at least as far apart as their diameter.

*First antennæ.* About three-quarters as long as the second pair; the second joint a little shorter than the first; the third considerably shorter than the second; the flagellum longer than the peduncle, with ten to twelve joints.

*Second antennæ.* Not more than one-third as long as the body; the peduncle stout; the last joint a little longer than the penultimate; the flagellum shorter than the peduncle, consisting of ten to twelve joints. In young from the marsupium the first antennæ are not shorter than the second; the flagellum in each pair is limited to two or three joints.

*First maxillæ.* The palp is minute, on a well-defined interruption of the hind margin of the outer plate.

*Second maxillæ.* The principal seta on the inner margin of the inner plate is not very elongate.

*First gnathopods.* ♂. The second joint widens rapidly to the middle; the fourth is not longer than the third; the fifth little longer than the sixth, widest subapically, with spines on both margins at the widest part; the sixth widening to a sort of palmar angle, a part of the sinuous hind margin being adapted to rest on the hind process of the fifth joint, the margin then abruptly turning to join the short spinulose palm, which is exactly fitted by the stout two-pointed finger.

*Second gnathopods.* ♂. The second joint has no conspicuous distal lobe. The fourth is produced, but not acutely; the fifth is produced into a shallow, fringed, cup-like process; the sixth is oval, the finger closing over an oblique, almost straight palm into the usual pocket, armed with two palmar spines; the hind margin not at all bulging, carrying spinules at two points.

*First gnathopods.* ♀. The fourth and fifth joints are as in the male; the sixth is oblong, slightly widening to the transverse palm, the hind margin sinuous, the finger acute, closely fitting the palm.

*Second gnathopods.* ♀. These are larger than the first pair, though very small compared with the second pair in the male. The fourth joint is subacutely produced; the fifth is shorter than the sixth, distally wider than the length, the process fringed with spinules; the sixth joint is oblong, slightly widened distally, the hind margin straight, the finger acute, scarcely reaching the end of the transverse palm. In young, taken from the marsupium, the first and second gnathopods have a general resemblance to the first gnathopods of the adult female. The marsupial plates of the second gnathopods and first pereopods have one distal corner subacutely produced; those of the second pereopods end squarely; in all, the fringing setæ are short.

*Pereopods.* None are strongly spined. The finger is curved; in the last three pairs the second joint is oblong oval, the front margin nearly straight, the hinder produced

downward in a rounded lobe; in the fourth pair this joint is more oblong than oval, widest proximally, whereas in the fifth pair it is much broader and widest distally. In the female the last three pairs are shorter and stouter than in the male, with the fourth joint more widened distally.

*Pleopods.* There are two or three coupling-spines on the peduncle, and on the inner margin of the first joint of the inner ramus four to five spines, not cleft, but at the apex a little dilated and hooked.

*Uropods.* Small; first pair with lateral spines on only one of the rami; third with the small ramus shorter than the peduncle.

*Telson.* Nearly square when flattened out, with slightly convex sides, the cleft not reaching beyond the middle, its sides not divergent.

*Length.* About 7 mm.

*Hab.* Korean and Japanese waters: 31° 40' N., 125° 50' E., Tong-kai, in seaweed (*Studer collection*); 34° 14' N., 129° 34' E., in seaweed, Korea (*Andréa*); 34° 40' N., 129° 50' E., Japan (*Andréa*); 37° 0' N., 131° 20' E. (*Studer collection*); Wladiwostock? (*H. Koch*); all the specimens belong to the Copenhagen Museum.

The specific name refers to the hammer-like appearance of the first gnathopods of the male.

*ALLORCHESTES COMPRESSUS* Dana. (Plate 33 B.)

1852. *Allorchestes compressa* Dana, Proceedings of the American Academy of Arts and Sciences, vol. ii, p. 205.
1852. *Allorchestes australis* Dana, P. Amer. Ac. vol. ii, p. 206.
1853. „ *Gaimardii*? Dana, United States Exploring Expedition, vol. xiii, p. 884, pl. 60, fig. 1 *a-i*.
1853. *Allorchestes australis* Dana, U.S. Expl. Exp. vol. xiii, p. 892, pl. 60, fig. 7 *a-o*.
1862. „ *Gaimardii* Bate, Catalogue of Amphipodous Crustacea in the British Museum, p. 41, pl. 6, fig. 9.
1862. *Allorchestes australis* Bate, Catal. Amph. Brit. Mus. p. 45, pl. 7, fig. 6.
1881. *Aspidophoreia diemenensis* Haswell, Proceedings of the Linnean Society of New South Wales, vol. v, p. 101, pl. 6, fig. 2.
1893. *Allorchestes (Hyale?) compressa* Della Valle, Fauna und Flora des Golfes Neapel, Monograph 20, p. 528 (see also pp. 519, 523).
1893. *Aspidophoreia (Hyale?) diemenensis* Della Valle, F. u. Fl. G. Neapel, Mon. 20, p. 530.

The body is compressed, especially at the pleon. The first four pairs of side-plates are deep, the fourth being also wide; the second to the fourth are quadrate, the fifth is shallow. The postero-lateral corners of the third pleon-segment are quadrate, with minutely-produced point.

*Eyes.* Oval, wider apart than the longer diameter.

*Antennæ.* In young from the marsupium the two pairs are equal; in the adult the proportions are rather variable. As Bate points out, Dana mistook a fused portion of the flagellum in the second pair for a joint of the peduncle.

*First antennæ.* Usually rather longer than the peduncle of the second pair; flagellum consisting of from ten to twenty joints.



*Second antennæ.* Flagellum much or not much longer than the peduncle, having from ten to twenty joints.

*Upper lip.* Broader than deep.

*First maxillæ.* Palp minute.

*Maxillipeds.* Second and third joints of palp broad.

*First gnathopods, ♂.* Fifth joint slightly longer than sixth, widest subapically, with spinules at projections of front and hind margins; sixth oblong, a little widened at the almost transverse convex palm; the finger matches the palm.

*Second gnathopods, ♂.* Robust, the second joint with small downward-produced lobe, the third also with the front lobed, the fourth apically produced behind, the fifth produced backward in a rather slender and not strongly spined lappet, the sixth large; the palm spinulose, very oblique, defined from the slightly bulging hind margin by palmar spines and the small hollow which receives the apex of the strong finger

*First gnathopods, ♀.* These are as in the male, except that the sixth joint is more elongate, equal to the fifth.

*Second gnathopods, ♀.* Rather larger than the first; the second joint not produced downward, the third without conspicuous lobe, the fourth as in the male, the fifth with its lappet stretching along part of the straight hind margin of the sixth, the sixth broader than in the first pair, slightly widening to the transverse palm, which the finger matches. The branchial vesicles are large, oval, with narrow neck. The marsupial plates are broad, oblong, produced at one corner, their setæ short.

*First and second peræopods.* Subequal, slender.

*Third peræopods.* The second joint is oblong oval, the front margin carrying spines, nearly straight, the hind margin nearly smooth; the fourth joint is widened, spinose on both margins.

*Fourth peræopods.* Considerably longer than the third, but with the second and fourth joints not quite so wide; the branchial vesicles in both these pairs have an accessory lobe.

*Fifth peræopods.* These are shorter than the fourth pair, especially in the male, but they have the second joint much larger and more rounded behind, widest subapically and broadly produced behind the third joint; the fourth joint not much widened; the finger, as in the other pairs, short and curved.

*First uropods.* The rami are decidedly shorter than the peduncle.

*Second uropods.* The rami are a little shorter than the peduncle.

*Third uropods.* The ramus is small, conical, shorter than the stout peduncle, tipped with a minute spinule.

*Telson.* Broad; the two quadrate lobes, separated by a linear fissure, are set at an angle one to another, gable-like.

*Colour.* For *Aspidophoreia diemenensis* Professor Haswell says: "surface (in the spirit specimen) ornamented with marbled spots of red, brown, and white, and with numerous, very minute, white dots, arranged in clusters of three or four."

*Length.* For *A. Gaimardii* Dana gives the equivalent of 14-16 mm., Bate 18 mm.; for *A. australis* Dana gives 12-13 mm.; for *A. diemenensis* Haswell gives 20 mm.; some

unnamed specimens kindly sent me by Professor Haswell, and which I refer to this species, measured about 11 mm.

*Hab.* Shores of Illawarry, New South Wales (*A. Gaimardii* and *A. australis* Dana); South Australia (*A. Gaimardii*, Bate); Tasmania (*A. diemenensis* Haswell); Jervis Bay, Australia (the specimens above-mentioned, received from Professor Haswell).

ALLORCHESTES PLUMICORNIS (Heller). (Plate 33 C.)

1866. *Nicea plumicornis* Heller, Denkschriften der k. Akad. d. Wissensch. math.-naturw. Cl. vol. xxvi. p. 5, pl. 1. figs. 8, 9.

1893. *Hyale Prevostii* Della Valle, F. u. Fl. Neapel, Mon. 20, Gammariini, p. 519.

The body is compressed and the back smooth. The first side-plates widened below.

*Eyes.* Elongate rounded, black.

*First antennæ.* They reach along nearly half the flagellum of the second pair. The first joint is longer than the second, the second than the third, which itself is not very short; the flagellum is much longer than the peduncle, of about eighteen successively lengthening joints.

*Second antennæ.* The flagellum is longer than the peduncle, of twenty-two joints; the terminal joints of the peduncle and first half of the flagellum are clothed below with long fascicles of setæ.

*First maxillæ.* The palp reaches the base of the spines of the outer plate.

*Maxillipeds.* The third joint of the palp is setose, the fourth long, acute.

*First gnathopods, ♂.* The second joint rapidly widens from the narrow base; the fourth has a bluntly-produced apex; the fifth forms a broad hind lobe, fringed along the hind margin with graduated spines; the sixth is oblong oval, rather longer than the fifth, widening slightly to the straight, oblique, spinulose palm; the finger thick, with outer margin abruptly curving to an acute apex.

*Second gnathopods, ♂.* The second joint is rather narrowly produced downward in front; the fourth bluntly produced behind; the fifth very short, but wide, embracing the base of the large oval sixth joint, which has a small group of spinules on the hind margin; the palm oblique, well defined by its angle and palmar spines; the finger strong, acute, much curved.

*Pereopods.* The fifth pair is like the fourth, but rather longer; the sixth joint slender, straight; the finger acute, little curved; the setule of its inner margin prominent, as in all the pereopods.

*Uropods.* All the rami have marginal spines. In the third pair the peduncle is rather shorter than the telson, the ramus nearly as long as the peduncle.

*Telson.* Cleft to the base; the lobes below the middle narrow to rounded, well-separated apices. As usual, the lobes *in situ* are inclined one towards the other.

*Length.* 9-11 mm.

*Hab.* Mediterranean, at Ragusa in the Adriatic, at Genoa, and at Villefranche.

Male specimens from Villefranche have been kindly sent me by the well-known carcinologist, M. Ed. Chevreux. According to Heller, only females were known to him;

but I feel convinced that his figures and description refer to the male sex. The hirsute second antennæ and the great difference in the size of the two pairs of gnathopods are strong evidence of this.

*ALLORCHESTES HUMILIS* Dana. (Plate 33 D.)

1852. *Allorchestes humilis* Dana, P. Amer. Ac. vol. ii. p. 206.

1853. „ „ Dana, U.S. Expl. Exp. vol. xiii. p. 890, pl. 60. fig. 6 *a-e*.

1862. „ „ Bate, Catal. Amph. Brit. Mus. p. 45, pl. 7. fig. 5.

1893. ? *Hyale Prerostii*, ♀, Della Valle, F. u. Fl. G. Neapel, Mon. 20, Gammarini, p. 528.

*Eyes.* A little oblong, according to Dana. In Saghalien specimens, small, round, light-coloured.

*First antennæ.* A little shorter than the second pair; the peduncle two-thirds as long as the peduncle of the following pair; the flagellum containing from six to eight joints, which are very distinct, with moniliform appearance, and long filaments on the widened apices.

*Second antennæ.* About one-third the length of the body; the last two joints of the peduncle subequal; the flagellum containing nine to ten joints, which are not very long nor distally widened; the setæ being in Dana's account all very short, but not very short in Saghalien specimens.

*First maxillæ.* The palp reaches the base of the spines of the outer plate.

*Maxillipeds.* The third joint of the palp is said by Dana to be narrow, nor is it wide in the Saghalien specimens; but this joint often looks much narrower than it is, unless specially flattened for examination.

*First gnathopods.* The fifth joint is scarcely longer than broad; the sixth is much longer, oblong, widening to the oblique, spinulose palm, which is shorter than the spinuliferous hind margin, and has a strong palmar spine.

*Second gnathopods.* These are very similar to the first pair, and the sixth joint, though considerably, is not exorbitantly larger; the fourth joint has the hind margin somewhat produced, which is not the case in the first pair; the fifth has a narrower hind lobe; the sixth is oblong oval, the closely-fringed palm more oblique, and subequal to the hind margin, which carries two groups of spinules. The finger, according to Dana, is "curved and short, and shuts close against" the palm; in the Saghalien specimens its outer margin is strongly convex, and the inner, which matches the palm, carries six minute setules.

*Percopods.* These are moderately stout, the finger curved, with the usual setule on the inner margin. In the last three pairs the second joint is nearly orbicular, with the hind margin slightly crenulate. In the Saghalien specimens the branchial vesicles are narrow at the base, then becoming inflated.

*Third uropods.* These are very short. In the Saghalien specimens the ramus is as long as the peduncle, each carrying apical spines.

*Telson.* This is not mentioned by Dana. It is short, divided beyond the middle, but not to the base, each half as broad as long; the apices are divergent, truncate, tipped with spinules.

*Length.* "Four lines," about 8 mm. (Dana); 5 mm. (Saghalien specimens). Dana prefixes "Female?" to his description; but, in my opinion, his description and figures refer to the male.

*Hab.* New South Wales, from shallow pools of water along shores of Port Jackson (Dana); Saghalien, 49° 30' N., 142° 8' E. (*Andréa*, specimens belonging to the Copenhagen Museum).

#### Fam. PHLIADIDÆ.

Antennæ short, first pair without accessory flagellum. Upper lip with distal margin undivided. Lower lip without inner lobes. Mandibles without palp. First maxillæ with the palp obsolete. Gnathopods simple or only feebly subchelate. Pleopods with the peduncles laterally produced in one or more of the pairs. Third uropods not biramous. Telson entire.

- |    |   |   |   |
|----|---|---|---|
| 1. | { | Palp of the maxillipeds three-jointed, 2.             |   |
|    | { | Palp of the maxillipeds four-jointed, 3.              |   |
| 2. | { | Second uropods with two rami. . . . .                 | <i>Phlias</i> Guérin, 1836.                 |
|    | { | Second uropods with one ramus . . . . .               | <i>Pereionotus</i> Bate and Westwood, 1862. |
| 3. | { | Third pleopods with rudimentary inner ramus. . . . .  | <i>Iphiplateia</i> n. g.                    |
|    | { | Third pleopods with well-developed inner ramus, 4.    |   |
| 4. | { | First four pairs of side-plates very deep. . . . .    | <i>Iphinotus</i> , n. g.                    |
|    | { | First four pairs of side-plates very shallow. . . . . | <i>Bircenna</i> Chilton, 1884.              |

The genus *Iphigenia*, G. M. Thomson, is represented as having a three-jointed palp to the maxillipeds, but in other respects its resemblance is so close to *Iphinotus* that its right to stand as a separate genus awaits confirmation.

All the genera of this family have representatives in the Southern Ocean; but *Pereionotus* pertains also to English and Mediterranean waters, and *Phlias* to the Mediterranean.

#### IPHIPLATEIA, n. g.

Body much depressed, pleon strongly flexed. Head immersed between the projecting side-plates, square, feebly rostrate, with the eyes on the prominent front corners. First four pairs of side-plates very large, outspread. Antennæ short, subequal in length, the first the broader, the second attached on the under surface of the head, some way to the rear of the first. Upper lip with entire convex distal margin. Mandibles without palp. Lower lip without inner lobes. First maxillæ without inner plate; palp obsolete, but the position for it marked; apical teeth of outer plate five in number. Second maxillæ with the small outer plate continuous with the base, the inner broader. Maxillipeds with palp extending beyond the outer plate; the fourth joint small, not unguiform. First and second gnathopods simple. Third, fourth, and fifth pereopods with widely-expanded second joint, and the fourth joint broad. Second and third pleopods with lateral expansion of the peduncle, the third with rudimentary inner ramus. First and



second uropods biramous, the second smaller than the first; third uropods one-jointed, very small. Telson entire.

The name is derived from the prefix *ίφι-*, signifying strength, and *πλατεία*, broad. Only one species is at present known.

*IPHIPLATEIA WHITELEGGEI*, n. sp. (Plate 34.)

The body forms a broad oval; the basal joint in the first antennæ, and the second joint in the last three pairs of peræopods, helping to complete the figure. It is dorsally a little convex and smooth, or feebly angular along the centre; the last segment of the peræon slightly upraised, and the first segment of the small pleon projecting backward in a prominent tubercle, the remainder of the pleon being rather tightly folded under the body, its sixth segment dorsally undeveloped. The head is embedded between the subtriangular first side-plates, which project forward beyond its rounded corners, these being almost on a level with the short obtuse rostrum. The second side-plates oblong; the third a little more widened distally; the fourth very broad, excavate behind; the fifth, sixth, and seventh small, bilobed, the front lobe the larger.

The *eyes* are small, oval, dark, close to the corners of the head.

*First antennæ.* First joint nearly as broad as long, with large advanced inner lobe; second similar in shape, but much smaller; third narrow, not lobed; flagellum very small, two-jointed, second joint minute.

*Second antennæ.* Basal joints, small, obscure, seemingly soldered to underside of head; penultimate joint of peduncle rather larger than ultimate, neither large; flagellum two-jointed, small, scarcely so long as last joint of peduncle, second joint scarcely visible.

*Epistome* rounded above. On either side of it is a small, rounded oval, pellucid space in the ventral surface of the head.

*Upper lip.* At the centre of the margin are two oval spaces, each enclosing a tuft of short hairs, the two tufts not convergent.

*Mandibles.* Cutting-edge quadridentate; spine-row consisting of three minute spinules; molar tubercle wanting, unless represented by a broad pellucid spine tipped with a setule.

*First maxillæ.* Of the apical spines four form a row, the fifth being set beside them near the centre.

*Second maxillæ.* Inner plate with truncate apical margin, fringed with five very short and small but rather broad spines, the innermost the largest; the outer plate very narrow, tipped with a few spinules. The mandibles and maxillæ are in this genus not only exceedingly small, but so closely compacted that it is difficult to separate them.

*Maxillipeds* comparatively wide. Inner plate with four minute spine-teeth on the truncate apex, outer plate rather broad, the inner margin carrying six widely-spaced insignificant spine-teeth; first three joints of palp not greatly differing in length; second much broader than third; fourth small, cylindrical, and so pellucid that its margins may easily be mistaken for a couple of setæ, its apex tipped with a very long seta.

*First gnathopods.* Second joint not nearly reaching the distal border of the side-plate; third as long as fourth, the latter, as usual, underriding the wrist; the wrist or fifth joint

a little longer than the sixth, which narrows to the apex, forming no palm; finger small, curved, with a setule on the concave margin, near to the nail. The hand and finger have a closely similar structure in both gnathopods and all five pereopods.

*Second gnathopods* like the first, except that the fifth and sixth joints are more nearly equal. Branchial vesicles narrow.

*First pereopods.* Second and third joints as in the gnathopods; fourth scarcely longer than wide, narrow at the base, then widening to a lobe in front; fifth joint a little shorter and narrower, as broad as long, much shorter than the sixth.

*Second pereopods* like the first.

*Third pereopods.* Second joint rounded oval, little longer than broad, the hinder expansion broadly produced below the third joint; fourth as broad as long, hind lobe well expanded and produced downward; fifth much narrower, a little longer than broad, distally narrowed, shorter than sixth.

*Fourth pereopods* like the third, but the second and fourth joints larger.

*Fifth pereopods.* Second joint shorter than in the two preceding pairs, but even wider, the great hind expansion having a somewhat three-sided margin; the remaining joints nearly as in the third pair.

*First pleopods.* Peduncle twice as long as broad, with five or six coupling-spines; rami with about ten joints, inner ramus the shorter, with no cleft spines.

*Second pleopods.* Peduncle much shorter, distally widened, so as to be fully as broad as long, with five or six coupling-spines on the projection; rami nearly as in first pair.

*Third pleopods.* Peduncle very short, with a long narrow projection, carrying at its apex three coupling-spines; inner ramus minute, oval, unjointed, without setæ; outer ramus normal, but with the divisions of the joints somewhat obscure.

*First uropods.* Peduncle longer than the straight inner, rather shorter than the curved outer ramus. The rami with obtuse apices, the *vis-à-vis* margins microscopically pectinate, the others finely ciliate.

*Second uropods* much smaller than first, otherwise similar.

*Third uropods* consisting of a small oval piece, nearly concealed by the telson. A minute setule projects from outer margin of the apex.

*Telson* semi-oval, with narrow apex projecting beyond the third uropods.

*Length* about a fifth of an inch, 5 mm.

*Hab.* Australian waters. Specimens sent me from Watson's Bay, New South Wales, by Mr. Thomas Whitelegge, who called attention to their peculiar appearance, and in compliment to whom I have named the species.

#### PEREIONOTUS Bate and Westwood.

1862. *Pereionotus* Bate and Westwood, British Sessile-eyed Crustacea, vol. i. part 5, p. 226.

1862. „ Bate, Catalogue of the Amphipodous Crustacea in the British Museum, p. 374.

1863. *Ieridium* Grube, Sitzungsberichte der Schles. Gesellsch. vom 18ten Februar 1863.

1864. „ Grube, Archiv für Naturgeschichte, Jahrg. 30, Bd. i. p. 209.

1888. *Pereionotus* Stebbing, 'Challenger' Amphipoda, pp. 81, 340, 348.

1893. „ Della Valle, F. u. Fl. G. Neapel. Mon. 20, Gammarini, p. 559.

Body depressed, pleon strongly flexed. Head square, feebly rostrate, with the eyes on the prominent front corners. Antennæ short, the second shorter and much more slender than the first, attached on the under surface of the head some way to the rear of the first. Mouth-organs in general like those of *Iphiplateia*, the maxillipeds excepted, in which the palp does not reach beyond the outer plate, and is only three-jointed. The limbs of the peræon also nearly as in *Iphiplateia*, except that the second joint of the fifth peræopods is very much smaller than that of the third and fourth pairs. All the pleopods with both rami well developed, the peduncle laterally produced in the third pair or in both the second and third pairs. The first uropods biramous; the second much shorter, uniramous; the third one-jointed, obscure, completely covered by the telson, which is entire.

The type species, *Pereionotus testudo* (Montagu), seems to be almost certainly identical with *Ieridium fuscum* Grube, while *Phlias serratus* Guérin is certainly distinct. I am indebted to M. Ed. Chevreux for a Mediterranean specimen labelled *Ieridium fuscum*, but which has the first and second uropods both biramous as in the genus *Phlias* of Guérin.

#### PEREIONOTUS THOMSONI, n. sp. (Plate 35 A.)

The *body* is a broad oval. The medio-dorsal line throughout the peræon and in the first two segments of the pleon is raised to a carina, formed by a succession of processes not quite so long as their respective segments, that on the first peræon-segment being preceded by an acute point directed forward.

*Head.* The lateral angles extend a little in advance of the small, but distinct, rostrum; and, though on the whole rounded, they have a minutely acute point on the inner side.

The first four pairs of side-plates are without conspicuous setules on the distal margin.

*Eyes.* Rounded oval, dark, situated on the lateral lobes of the head.

*First antennæ.* The inner margin of the broad first joint is indentured; the second joint cylindrical, not lobed; the third conical; the flagellum small, two-jointed, with the long hyaline filaments common to all the species of this family.

*Second antennæ.* Very slender; the last joint of the peduncle is rather longer than the penultimate; the flagellum consists of one short joint with several setæ about thrice as long as the joint. On one side of the specimen the flagellum is possibly two-jointed.

*Upper lip.* The hairs on the distal margin are convergent.

*First maxille.* These show a small spinule in the position of the palp. This minute character may be generic; but in the other species only a slight bulge of the margin has been perceived at the point in question.

*Maxillipeds.* Inner plates with three or four apical spine-teeth; the outer plates rather large, minutely fringed on distal half of the inner margin; palp only three-jointed, and not quite reaching the apex of the outer plate.



*First and second gnathopods and first and second peraeopods.* All these are scarcely distinguishable from the corresponding limbs in *Iphiplateia Whiteleggei*. In common with the three following pairs of peraeopods they have on the inner margin of the sixth joint not only a tolerably strong apical spine, but a similar one nearer the middle.

*Third peraeopods.* The second joint is broader than long, with very convex hind margin; the fourth joint is not longer than the third, and is very broad by reason of the great hind lobe; the fifth joint is neither so long nor so broad as the third; the sixth and the finger are as in the kindred species in general, but the inner setule of the finger not very strong.

*Fourth peraeopods.* These are like the third, except that the lobe of the fourth joint is less expanded, and the second joint is smaller.

*Fifth peraeopods.* These are like the fourth, except in regard to the second joint, which is not only much smaller, but differently shaped, the hinder expansion not quite reaching, instead of overlapping, the third joint.

*First pleopods.* Peduncle about twice as long as broad, with two coupling-spines; the rami slender, with elongate first joint and six or seven short ones.

*Second pleopods.* Peduncle broader than long, with two coupling-spines on the convex but not otherwise projecting inner margin, the rami broader than in the first pair.

*Third pleopods.* Peduncle short, with the coupling-spines on a short but very distinctly produced process; the rami broad, subequal, differing little from those of the second pair.

*First uropods.* The peduncle is slightly longer than the longer (probably the outer) ramus, the other ramus shorter and somewhat curved; both are narrow, each with a spinule and short stout spine on the apex.

*Second uropods.* The peduncle does not reach the end of the telson; it has the apex armed with a spinule and short, stout spine; the narrowly oval, single ramus similarly armed.

*Third uropods.* Attached to the ventral plate, which represents the sixth pleon-segment, are two membranous, rather conical, plates, which together occupy the breadth of the telson, but do not reach its apex.

*Telson.* Triangular, with rounded apex.

*Length.* Less than 5 mm.

*Hab.* Watson's Bay, Australia. A single specimen, a female with eggs, occurred in the gathering from low-tide line, obligingly sent me by Mr. Thomas Whitelegge.

The species is remarkably like *Percionotus testudo*, as figured by Della Valle, to whom I am indebted for a specimen from the Mediterranean. It differs by the absence of the lateral tubercles on the peraeon-segments, the want of any conspicuous setules on the distal margin of the first four pairs of side-plates, the presence of a submedian spine on the inner margin of the sixth joint of the limbs, and in having the peduncle of the second pleopods not outdrawn. The third uropods are obscure in both species, but apparently present and similar in both.



## IPHINOTUS, n. g.

Body much depressed, pleon strongly flexed. Head immersed between the projecting side-plates, square, feebly rostrate, with the eyes on the prominent front corners. First four pairs of side-plates very large, outspread. Antennæ short, subequal in length, the first the broader. Upper lip with the convex distal margin rather flattened. Mouth-organs in general as in *Iphiplateia*, the maxillipeds excepted, these having the fourth joint of the palp well-developed, unguiform. The limbs of the peræon nearly as in *Iphiplateia*, except that the second and fourth joints in the fifth peræopods are very much smaller than those in the third and fourth pairs. All the pleopods with both rami well developed, the peduncle in the second and third pairs laterally produced in a long and strong process. The first uropods slender, the second stout, both biramous, with the peduncle much longer than the rami. The third uropods membranous, not biramous, small. Telson entire.

The name is derived from the prefix  $\iota\phi\iota$ -, and  $\nu\omega\tau\omicron\varsigma$ , back.

## IPHINOTUS CHILTONI, n. sp. (Plate 35 B.)

The body is broad oval, with dorsal carina, of which the condition of the specimens no longer allows a minute description.

*Head and eyes* as in *Pereionotus Thomsoni*.

*First antennæ.* First joint large, distally widened; second cylindrical; third scarcely longer than broad; flagellum of three small joints, with the usual filaments.

*Second antennæ.* Moderately stout; the last joint of the peduncle longer than the penultimate; flagellum of five joints, of which the last four are very small, all setose.

*Upper lip.* Broader than deep, with converging hairs on the almost straight distal margin.

*Mandibles, lower lip, and maxillæ* as in *Iphiplateia*.

*Maxillipeds.* Inner plates with four apical spine-teeth, outer with minute setules along inner margin; palp four-jointed, reaching considerably beyond the outer plates; the fourth joint unguiform.

*First and second gnathopods and first and second peræopods.* These are in general as in *Pereionotus Thomsoni*, but the finger is abruptly narrowed at the sharp hooked nail, and the setule of the inner margin is strong.

*Third and fourth peræopods.* Second joint very large, only a little longer than broad, but rather longer in the third pair than in the fourth; the fourth joint greatly expanded, the great hind lobe being nearly double the length of the front margin; fifth joint a little longer than the third; sixth joint and finger as in the preceding pairs.

*Fifth peræopods.* These are much smaller than the third or fourth, especially in regard to the second and fourth joints; the second, with its hind expansion, not quite reaching the third joint; the hind lobe of the fourth scarcely longer than its front margin.

*First pleopods.* Peduncle not very long, and not expanded.

*Second pleopods.* Peduncle short, but produced on the inner side to a long and

powerful process, at the truncate apex of which are four coupling-spines; the rami are long, of eleven or twelve joints, the outer ramus the longer.

*Third pleopods.* These closely resemble the second pair, but the process of the peduncle appears to be a little less massive and the rami appear rather less strong.

*First uropods.* Peduncle slender, more than twice as long as the slender, subequal, finely ciliated rami.

*Second uropods.* Shorter, but much stouter, than the first; the peduncle about twice as long as the stumpy rami, and fringed near the outer margin with some eleven short spines.

*Third uropods.* Membranous, broad above, but together not so broad as the telson; the pointed apex projecting just beyond the telson. In the two specimens figured there is the appearance of a broad basal and a small triangular apical joint; but this may be due to an accidental folding, as in a third specimen these uropods are single-jointed.

*Telson.* Much wider than long, membranous, with a few slight setules at the sides; the apex slightly angular, the angle very obtuse.

*Length.* About 5 mm.

*Hab.* Lyttelton Harbour, New Zealand. Specimens, labelled "*Iphigenia typica*," kindly sent me many years ago by Mr. (now Dr.) Charles Chilton, F.L.S.

In 1882, Mr. G. M. Thomson, F.L.S., in the 'Transactions of the New Zealand Institute,' vol. xiv. p. 237, established under the family Corophiidae the genus *Iphigenia*, which he held to be allied to *Teilinus* Dana. He described and figured (pl. 18, fig. 6) the single species *Iphigenia typica*, from two specimens obtained by the dredge in Otago Harbour, New Zealand. He gives the length as "0.12 inch." Upon comparing his description and figures of this peculiar new form with the specimens sent me by his friend Mr. Chilton, I did not venture to suppose that there could be a question of more than one species. Nevertheless, one important feature obviously called for remark. The Lyttelton Harbour specimens were provided with a four-jointed palp to the maxillipeds (see 'Challenger' Amphipoda, p. 1638); while in Mr. Thomson's figure the palp is three-jointed. As this circumstance is not referred to either in his generic definition or description of the species, and as the figure itself is small and not very clearly printed, there might be some doubt as to what was really intended. But, to make up for the inadequacy of the printed figures, Mr. Thomson very kindly sent me clear tracings of the large original drawings of some of them. One tracing shows the palp of the maxillipeds considerably overlapping the outer plate, but unmistakably consisting of only three joints. In the accompanying manuscript, full of valuable notes on New Zealand Amphipoda, after explaining that he no longer possessed any specimens of *Iphigenia typica*, Mr. Thomson added, "I have a suspicion that the animal is only a young state of some different form, partly from the apparent absence of one of the thoracic legs and partly because the uropoda appear to be very incomplete." The apparent incompleteness of the uropods was no doubt only due to the difficulty of perceiving the membranous third pair lying closely beneath the telson. As the fifth pereopods are shown in the figure, the absence of one of the thoracic legs can only have been accidental, nor was the immaturity of the specimens likely to have affected the number of joints in the palp of the maxillipeds.

According to present information, therefore, it seems proper to place in different genera the Lyttelton Harbour specimens here described, and the original *Iphigenia typica* Thomson. It has been earlier pointed out by von Martens that the name *Iphigenia* is much preoccupied. The new name *Iphinotus*, therefore, will take its place, should it appear hereafter that the maxillipeds in Thomson's species were really four-jointed, but accidentally defective. On the other hand, if Thomson's figure show the true state of the case, when that is made clear, it will be necessary and time enough to give his genus a new name.

But the two species, *Iphinotus Chiltoni* and *Iphigenia typica* are in many points so closely alike that, while they perhaps belong to different genera, perhaps also they are but one species. In addition, however, to the recorded difference in the maxillipeds, there is a difference in the peræopods, the fourth pair having its second joint subequal to that in the third pair in the Lyttelton Harbour specimens, but considerably smaller in those described by Mr. Thomson. Again, the latter are said to have the "telson about as broad as long, nearly semicircular"; whereas in the Lyttelton Harbour specimens it is much broader than long and slightly angular at the apex. Apparently also in the first described specimen the dorsal line is much more strongly tuberculate. The validity of all these marks of distinction remains to be determined by future observation.

#### BIRCENNA Chilton.

1884. *Bircenna* Chilton, 'Transactions of the New Zealand Institute,' vol. xvi. p. 264.

Body broad. Head not rostrate. Antennæ short, subequal, both pairs very slender; second with prominent gland-cone. Mandibles without palp. First maxillæ with inner plate carrying an apical seta, outer plate having eight apical spines; position of palp marked, but no trace of palp apparent. Maxillipeds with outer plate not extending beyond the inner; palp four-jointed, fourth joint small, not unguiform. First and second gnathopods with the hinder apex of the sixth joint a little produced. Fifth peræopods larger than fourth, fourth than third. Pleopods all biramous, and all with the peduncles broadly produced laterally. First and second uropods with unequal curved rami. Third uropods each consisting of an apically bifid plate, not covered by the triangular telson.

This genus, represented by the single New Zealand species, *Bircenna fulvus* Chilton, stands apart from the rest of the family by many of its features. Among the less obvious are the characters of the first maxillæ and maxillipeds, the first maxillæ having an inner plate, which seems to be wanting in the other genera, and eight teeth instead of five on the outer plate, while in the maxillipeds the outer plate does not, as in the other genera, extend beyond the inner plate. I am indebted to my friend Dr. Chilton for the opportunity of dissecting a specimen of *Bircenna fulvus*.



## Fam. MELPHIDIPPIDÆ.

*Gammarus spinosus* Goës, 1866. transferred to *Melphidippa* by Bocck in 1871, is distinct from *Gammarus spinosus* Lamarck, 1818. It may now be called *Melphidippa Goësi*.

*Neohela serrata* Stebbing, 1888, should be called *Melphidippa serrata*.

## Fam. GAMMARIDÆ.

## PARACRANGONYX, n. g.

All the side-plates shallow. Eyes rudimentary. First antennæ longer than the second, with small accessory flagellum. The pleopods abnormal, having only one ramus. The third uropods with very small inner ramus. Telson entire.

The type-species is *Paracrangonyx compactus* (Chilton), 1882, from wells in New Zealand.

## APOCRANGONYX, n. g.

Eyes wanting. First antennæ longer than the second, with small accessory flagellum. The third uropods rudimentary, without rami. Telson entire.

The type-species is *Apocrangonyx lucifugus* (Hay), 1882, from a well in Illinois.

## HYALELLOPSIS, n. g.

Body smooth. Fourth to sixth pleon-segments very short. Antennæ short, first rather the longer, with one-jointed accessory flagellum. Fifth peræopod short, with very large second joint. Uropods short, the third uniramous. Telson small, rounded.

The generic name alludes to the likeness between this genus and the Orchestid *Hyaletta* in the caudal part of the animal.

The type-species is *Hyaletopsis Czyrniański* (Dybowsky), 1874, from Lake Baikal.

## Gen. PALLASEA Bate, 1862.

In this genus I place:—1. *Gammarus asper* Dybowsky, 1874, distinct from *Gammarus asper* Dana, 1852, giving it the new name *Pallasea Dybowski*; 2. *P. Reisnerii* (Dybowsky), 1874; 3. *P. cancellus* (Pallas), 1772; 4. *P. Gerstfeldtii* Dybowsky, 1874; 5. *P. quadrispinosa* Sars, 1867; 6. *P. Kesslerii* (Dybowsky), 1874; 7. *P. baikali*, a new name for *Gammarus Lovenii* Dybowsky, 1874, which is distinct from *Gammarus Lovenii* Bruzelius, 1858; 8. *P. Brandtii* (Dybowsky), 1874; 9. *P. Grubii* (Dybowsky), 1874; 10. *P. cancelloides* (Gerstfeldt), 1858. All these species of *Pallasea* occur in Lake Baikal.



## PARAMICRUROPUS, n. g.

One of the pleon-segments abruptly elevated above the next. Fifth and sixth pleon-segments very small. Antennæ short, the first the longer, with small accessory flagellum. Third uropods rudimentary, the rami not very unequal. Telson small.

The species are *Paramicruropus Solskii* (Dybowsky), 1874, and *Paramicruropus Taczanowskii* (Dybowsky), 1874, both from Lake Baikal.

## Gen. GAMMARELLUS Herbst, 1793.

Under the designation *Cancer* (*Gammarellus*) Herbst has grouped a large number of species, and for some part of the group it seems right that *Gammarellus* should be used as the generic name. The majority of the species are Amphipoda, so that it seems further not unreasonable to select an amphipod as type of the genus. The first species in Herbst's list that is an amphipod is the one which he calls *Cancer* (*Gammarellus*) *homari*. This is a species instituted by Fabricius in 1779. It was called *Amathia Sabinii* by Bate in 1862; but the name *Amathia*, due to Rathke in 1837, having been preoccupied by Lamarek in 1812, Bate and Westwood altered the generic term to *Amathilla*. Spence Bate, however, had previously called the young form of the above-mentioned species *Grayia imbricata*, so that *Grayia* has precedence of *Amathilla*. Since a change, then, in any case is necessary, the opportunity is favourable for restoring Herbst's *Gammarellus*, and there is an additional advantage in that we are thus enabled to dispense both with *Grayia*, which is inconveniently similar to the name of a reptilian genus, *Graia* Günther, 1858, and with *Amathilla*, which is equally near to the molluscan name *Amathella* Gray, 1859.

The two species coming under this revived generic name are *Gammarellus homari* (Fabricius), 1779, and *Gammarellus angulosus* (Rathke), 1843. A third nominal species, *Gammarellus carinatus* (Rathke), is not certainly distinct from *G. homari*.

## EUCRANGONYX, n. g.

Like *Crangonyx* in general, but with a small inner ramus to the third uropods. Telson emarginate.

The species assigned to this genus are:—1. *Eucrangonyx mucronatus* (Forbes), 1876; 2. *Eu. Vejdovskyi*, a new name for *Crangonyx subterraneus* Vejdovsky, 1896, which seems to me distinct from the species so named by Bate in 1859; 3. *Eu. Packardii* (Smith), 1888; 4. *Eu. gracilis* (Smith), 1871; 5. *Eu. antennatus* (Packard), 1881. *Eu. gracilis* is from Lake Superior and Lake Huron, the others from wells or subterranean streams.

## Gen. AXELBOECKIA, n. n.

The name is proposed as a substitute for *Bœeckia* Sars, 1894, preoccupied by Malm in 1870, and by G. S. Brady in 1871.

The generic name is given in honour of the late Axel Boeck, a distinguished carcinologist.

The species assigned to this genus are *Axelboeckia spinosa* (Sars), 1894, from the Caspian Sea, and *Axelboeckia Carpenterii* (Dybowsky), 1874, from Lake Baikal.

#### BRACHYUROPUS, n. g.

With median rostrate carina. Fourth side-plate with projecting tooth. First antennæ much the longer, with long accessory flagellum. First and second gnathopods similar, subchelate. Last three peræopods elongate. First and second uropods elongate, third rudimentary, with very unequal rami. Telson apically emarginate.

The generic name alludes to the shortness of the third uropods.

The species included are *Brachyuropus Grewingkii* (Dybowsky), 1874, and *Brachyuropus Reichertii* (Dybowsky), 1874, both from Lake Baikal.

#### Gen. BRANDTIA Bate, 1862.

In addition to the type-species *Brandtia latissima* (Gerstfeldt), 1858, there may be referred to this genus:—2. *B. lata* (Dybowsky), 1874; 3. *B. tuberculata* (Dybowsky), 1874; 4. *B. Morawitzii* (Dybowsky), 1874; 5. *B. smaragdina* (Dybowsky), 1874; 6. *B. fasciata*, a new name for *Gammarus zebra* Dybowsky, 1874, which is distinct from *G. zebra* Rathke, 1843. All these species occur in Lake Baikal.

#### MICRUROPUS, n. g.

Without carinæ or overarching segments. Antennæ short, with subequal peduncles, the first pair usually longer than the second; accessory flagellum one-jointed. First and second gnathopods with subequal hands. Third uropods small or very small; the rami unequal; outer ramus usually one-jointed. Telson cleft.

The generic name refers to the smallness of the third uropods.

The species referred to this genus are:—1. *Micruropus puella* (Dybowsky), 1874; 2. *M. inflatus* (Dybowsky), 1874; 3. *M. vortex* (Dybowsky), 1874; 4. *M. talitroides* (Dybowsky), 1874; 5. *M. littoralis* (Dybowsky), 1874; 6. *M. glaber* (Dybowsky), 1874; 7. *M. rugosus* (Dybowsky), 1874; 8. *M. Wahlii* (Dybowsky), 1874; 9. *M. Firsenii* (Dybowsky), 1874; 10. *M. perla* (Dybowsky), 1874; 11. *M. Klukii* (Dybowsky), 1874; 12. *M. pachytus* (Dybowsky), 1874. All from Lake Baikal.

#### NEONIPHARGUS, n. g.

First to fourth side-plates much deeper than those which follow. Eyes well developed (or wanting). First antennæ the longer; accessory flagellum very small, two-jointed. Mouth-parts nearly as in *Niphargus* (but first maxillæ in the type-species said to have six instead of seven spines on the outer plate). First and second gnathopods similar,

subchelate; fifth joint distally wide, sixth subquadrate. Fifth peræopods shorter than fourth. Third uropods not elongate; outer ramus one-jointed, inner minute. Telson partly (or wholly) cleft.

The type-species is *Neoniphargus Thomsoni*, a new name for Mr. G. M. Thomson's *Niphargus montanus*, 1893, from Mount Wellington, in Tasmania. As Costa's *Gammarus montanus*, 1857, appears to be a *Niphargus*, the name used by Thomson was pre-occupied. A second species, doubtfully assigned to this new genus, is the *Gammarus puteanus* of Moniez, 1889, from subterranean waters in France. It was renamed *Niphargus Moniezi* by Wrześniowski in 1890.

#### IIAKONBOECKIA, n. g.

Near to *Axelboeckia* and *Gmelinopsis*. Segments of peræon with margins acutely produced. Head with rostral and lateral projections. Antennæ with equal peduncles, first pair the longer; accessory flagellum very small. Hand of first gnathopods like that of second, but larger. Third to fifth peræopods with the second joint broad, not produced downward. Third uropods with subequal rami, the outer ramus (seemingly) one-jointed. Telson cleft nearly to base.

The generic name is given in compliment to Hakon Boeck, who edited his brother's well-known work on the Amphipoda of the North.

The type-species is *Hakonboeckia Strauchii* (Dybowsky), 1874, from Lake Baikal.

#### BAIKALOGAMMARUS, n. g.

Near to *Gammarus*. Pleon-segments, from the second, third, or fourth to the sixth, with a few dorsal setules or spinules. First antennæ longer than second, but with a shorter peduncle; accessory flagellum very short. Hand of first gnathopods not smaller than that of second. In third to fifth peræopods the second joint broad, the wing produced downward in a long rounded lobe. Third uropods rather elongate; the peduncle as long as the two-jointed outer ramus. Telson cleft.

The generic name alludes to Lake Baikal, so prolific in Gammaridæ.

The type-species is *Baikalogammarus pullus* (Dybowsky), 1874, from Lake Baikal.

#### Gen. MELITA Leach, 1814.

Besides the accepted species of this genus, there may be referred to it with more or less probability *Maera confervicola* Stimpson, 1857; *Amphitoe Gayi* Nicolet, 1849; and *Gammarus tenuicornis* Stimpson, 1856.

Stimpson's Chinese species may or may not be the same as Dana's *Melita tenuicornis*, 1852, from New Zealand. Dana's *M. tenuicornis* is a synonym of his own *Melita inæquistyliis*; but it will be time enough to consider what should be the designation of Stimpson's species when its distinctness has been proved.

## PARACERADOCUS, n. g.

Side-plates not deep, the first larger than the fourth. First antennæ longer, but not stouter than the second, and with shorter peduncle. Upper lip transversely elliptic. Under lip with principal lobes deliscent. Palp of mandibles elongate; third joint not short. First maxillæ with large inner plate, carrying setæ only on the apex; the palp broad. Second maxillæ having the inner plate fringed along inner margin. Limbs of peræon, uropods, and telson as in *Ceradocus*.

The type-species is *Paraceradocus Miersii* (Pfeffer), 1888, from South Georgia.

## Gen. CERADOCUS Costa, 1853.

The species belonging to this genus are:—1. *Ceradocus orchestipes* A. Costa, 1853, which includes the preoccupied *Gammarus fasciatus* O. G. Costa, 1844; 2. *Ceradocus Torelli* (Goës), 1866; 3. *Ceradocus rubro-maculatus* (Stimpson), 1856; 4. *Ceradocus semiserratus* (Bate), 1862; of which the first and last are both named *Ceradocus fasciatus* by Professor Della Valle.

## Gen. MAERA Leach, 1814.

In this genus I propose the name *Maera Westwoodi* for *Gammarus Kröyeri* Bell and Westwood, 1855, which is distinct from the earlier *Gammarus Kröyeri* Rathke, 1843, and add to the accepted species Haswell's *Megamoera Mastersii*, 1880; Dana's *Gammarus asper*, 1852; his *Gammarus? indicus*, 1853; Gerstfeldt's *Gammarus kürgensis*, 1858; and Dana's *Amphithoe pubescens*, 1852. The last four are involved in some obscurity.

## Gen. ELASMOPUS A. Costa, 1853.

To the species already accepted in this genus may be added Haswell's *Megamoera suensis*, 1880; his *Moera viridis*, 1880; his *Megamoera Boeckii*, 1880; the *Moera crassimana* of Miers, 1884, the specific name becoming *crassimanus*; and the *Maera Miersi* of Wrześniowski, 1879. The last two are rather obscure.

## PLESIOGAMMARUS, n. g.

Near to *Gammarus*. Many of the segments have a marginal swelling. The pleon carries dorsal setæ, but no dorsal spines. Peduncle of first antennæ longer than that of second. Third to fifth peræopods with the second joint long and narrow. First uropods reaching to the end of the short third pair. Telson not cleft to the base.

The type-species is *Plesiogammarus Gerstaeckeri* (Dybowsky), 1874, from Lake Baikal.



## PHREATOGAMMARUS, n. g.

Without eyes. Upper lip broader than deep. First joint of mandibular palp not very short. First and second gnathopods equal. First and second peræopods much shorter than third. Fifth peræopods the longest, with sixth joint much longer than any of the other joints. Third uropods long, with equal, one-jointed, cylindrical rami. Otherwise like *Gammarus*.

The generic name means a well-*Gammarus*.

The type-species is *Phreatogammarus fragilis* (Chilton), 1882, from wells in New Zealand.

## OMMATOGAMMARUS, n. g.

Near to *Gammarus*. Dorsal spines only on fourth to sixth pleon-segments. Eyes of irregular form, with indented outline. First antennæ longer than second, but usually with shorter peduncle; accessory flagellum of more than one joint. Upper lip narrowed to a rounded apex. Under lip with inner lobes rudimentary. Third joint of mandibular palp not very elongate. First maxillæ having inner plate fringed with numerous setæ, outer carrying eleven spines; second joint of palp with about ten spine-teeth on one maxilla, and short spines on the other. Maxillipeds with outer plate reaching far along second joint of palp; spine-teeth and setæ numerous. Hand of first gnathopods not smaller than that of second. Third uropods having outer ramus about twice as long as inner, with simple setæ on its inner margin; inner ramus with feathered setæ on both margins. Telson cleft to the base.

The generic name alludes to curious character of the eyes.

The species included are:—*Ommatogammarus albinus* (Dybowsky), 1874; 2. *O. flavus* (Dybowsky), 1874; 3. *O. carneolus* (Dybowsky), 1874; 4. *O. amethystinus* (Dybowsky), 1874; all from Lake Baikal.

## ODONTOGAMMARUS, n. g.

In general like *Gammarus*, but lower front angle of fifth side-plates produced into a tooth; peduncle of first antennæ not shorter than that of second, its third joint as long as its second; hand of first gnathopods not smaller than that of second; third to fifth peræopods having second joint produced at lower hind angle into a tooth; third uropods not very long, but, as in *Gammarus*, the two-jointed outer ramus longer than the inner.

The generic name alludes to the tooth on the fifth side-plates.

The species included are *Odontogammarus calcaratus* (Dybowsky), 1874, and *O. margaritaceus* (Dybowsky), 1874, both from Lake Baikal.

## DIKEROGAMMARUS, n. g.

Fourth and fifth pleon-segments each raised dorsally to a spiniferous tubercle. First antennæ the longer; accessory flagellum well developed. The gnathopods larger in the male than in the female; the second larger than the first. The form agrees in general with *Gammarus*.

The generic name alludes to the two horn-like elevations on the pleon.

The species included are:—*Dikerogammarus macrocephalus* (Sars), 1896; 2. *D. hæmobaphes* (Eichwald), 1842; 3. *D. Grimmi* (Sars), 1896; 4. *D. Verreauxii* (Bate), 1862; 5. *D. fasciatus* (Say), 1818. The first three are found in the Caspian, the fifth in streams and ponds of the United States of America. The fourth is said to have been found by M. Verreaux in New Holland, Spence Bate ascribing the species to "Edwards, Ann. des Sc. Nat.," a vague reference which has not yet been verified.

## Gen. GAMMARUS J. C. Fabricius, 1775.

For *Gammarus tenellus* Sars, 1896, which is distinct from *Gammarus tenellus* Dana, 1852, I propose the equivalent name *G. ischnus*. For *G. marinus* Risso, 1826, which is distinct from *G. marinus* Leach, 1815, it is useless to propose a new name while the species remains unidentified.

## PÆKILOGAMMARUS, n. g.

All segments of peræon and pleon usually having dorsal hairs or spinules. Head rostrate. First antennæ with peduncle longer than that of the second pair, its third joint longer than the second. Upper lip with wide, almost straight, apical margin. Under lip, as in *Axelboeckia*, having the principal lobes separated by what may be rudimentary inner lobes. First maxillæ with about six setæ on the inner plate. Outer plate of maxillipeds not reaching far along the second joint of the palp. Hand of first gnathopods larger than that of second. Third uropods with equal rami, both carrying plumose setæ; outer ramus one-jointed. General character like *Gammarus*.

The generic name alludes to the variegated colouring of the several species.

The species included are:—*Pækilogammarus pictus* (Dybowsky), 1874; 2. *P. orchestes* (Dybowsky), 1874; 3. *P. talitrus* (Dybowsky), 1874; 4. *P. araneolus* (Dybowsky), 1874; all from Lake Baikal.

## ECHINOGAMMARUS, n. g.

In general like *Gammarus*, but with dorsal spines on segments anterior to the fourth of the pleon; the first antennæ longer than the second, though with shorter peduncle; the hand of the first gnathopods almost always larger than that of the second.

The generic name alludes to the numerous spines on the body.

The species included are:—1. *Echinogammarus Berilloni* (Catta), 1875, in certain fresh waters of Western Europe; 2. *E. verrucosus* (Gerstfeldt), 1858; 3. *E. Maackii* (Gerstfeldt), 1858; 4. *E. ochotensis* (Brandt), 1851, from Ochotsk Bay; and the following twenty-three, all instituted under the generic name *Gammarus* by Dybowsky in 1874, and all, like the second and third, found in Lake Baikal:—*saphirinus*, *Czerskii*, *lividus*, *viridis*, *cyaneus*, *testaceus*, *Sophiæ*, *fuscus*, *murinus*, *aheneus*, *sarmatus*, *capreolus*, *Uzzolzewii*, *strophthalmus*, *schamanensis*, *leptocerus*, *toxophthalmus*, *vittatus*, *Petersii*, *violaceus*, *ibex*, *Parcerii*, *polyarthrus*. Here, too, may perhaps be placed the obscure *Gammarus mutilus* of Abildgaard, 1789.

#### HETEROGAMMARUS, n. g.

In general like *Gammarus*, without dorsal teeth or carinæ or noticeable processes of head- or side-plates; accessory flagellum of first antennæ more than one-jointed; outer ramus of third uropods two-jointed; but separated from *Gammarus* by one or more of the following characters:—the peduncle of first antennæ longer than that of the second; the hand of the first gnathopods larger than that of the second; the first uropods very short.

The generic name alludes to the character of the genus as a second self to *Gammarus*.

The species included are the following eight, from Lake Baikal, instituted by Dybowsky in 1874, under the generic name *Gammarus*:—*Stanislavii*, *Sophianosii*, *capellus*, *ignotus*, *Flori*, *bifasciatus*, *branchialis*, and *albulus*; the last being given by Dybowsky as a var. *albula* of *Gammarus Flori*.

#### PARAPALLASEA, n. g.

Median carina not represented on peræon or first to third segments of pleon. Fourth side-plates broader and not less deep than the preceding, emarginate behind. Flagellum of first antennæ longer than the peduncle; accessory flagellum elongate. Third to fifth peræopods with second joint expanded. Telson deeply cleft. Other characters agreeing with *Pallasea*.

The species included are:—1. *Parapallasea Borowskii* (Dybowsky), 1874; 2. *P. Jagowskii* (Dybowsky), 1874; 3. *P. Puzyllii* (Dybowsky), 1874; all from Lake Baikal.

#### CARINOGAMMARUS, n. g.

Distinguished from *Gammarus* by having carinate segments, the carina medio-dorsal only; relative proportions of the peduncles in the two pairs of antennæ, of the two pairs of gnathopods, and of the inner and outer ramus of the third uropods, variable.

The species included are:—1. *Carinogammarus cinnamomeus* (Dybowsky), 1874; 2. *C. Wagii* (Dybowsky), 1874; 3. *C. pulchellus* (Dybowsky), 1874; 4. *C. Seidlitzii* (Dybowsky), 1874; 5. *C. rhodophthalmus* (Dybowsky), 1874—all these five from Lake

Baikal; 6. *C. caspius* (Pallas), 1771, from the Caspian Sea; 7. *C. atchensis* (Brandt), 1851, from Isle of Atcha and Unalasehka; 8. *C. subcarinatus* (Bate), 1862, from Bering Strait; 9. *C. fluriatilis* (Rösel), 1755, from rivers and ponds of Europe. To these may be added, though with some doubt, *C. macrophthalmus* (Stimpson), 1853, from Grand Manan; and *C. mucronatus* (Say), 1818, from Florida.

#### ACANTHOGAMMARUS, n. g.

Body with median, more or less dentate, carina, and also lateral or marginal carinæ more or less developed. Head with very short rostrum. Fifth side-plates much shallower than fourth. First antennæ the longer; accessory flagellum usually much developed, always with more than one joint. Third and fourth peræopods with second joint narrowed below. Third uropods with rami subequal, not foliaceous. Telson deeply cleft.

The generic name alludes to the dentate carinæ.

The species included are the following six from Lake Baikal, all instituted under the generic name *Gammarus* by Dybowsky in 1874:—*Cabanisii*, *Ziçukowiczii*, *Godlewskii*, *Rodoszkowskii*, *armatus*, and *parasiticus*.

#### EXPLANATION OF THE PLATES.

*n.s.*, natural size.

*a.s.*, upper antenna; *a.i.*, lower antenna.

*l.s.*, upper lip; *l.i.*, lower lip.

*m.*, mandible; *mx.* 1, 2, first and second maxillæ; *map.*, maxillipeds.

*gn.* 1, 2, first and second gnathopods.

*prp.* 1-5, first to the fifth peræopods.

*plp.* 1, 2, 3, first, second, and third pleopods.

*ur.* 1, 2, 3, first, second, and third uropods.

T., telson.

#### PLATE 30.

##### A. *Talorchestia Deshayesii* (Andouin).

The central figure is a lateral view of a young male specimen. The two gnathopods and second and fifth peræopods are shown separately, magnified to the same scale, with parts of each more highly magnified.

##### B. *Talorchestia tridentata*, n. sp.

The first and second gnathopods, and second and third peræopods, are magnified to the same scale, the inner surface of the hand of the second gnathopods being shown separately; parts of the three other limbs are more highly magnified.



**C.** *Orchestia Sulensoni*, n. sp.

Parts of the first and second gnathopods and of the second peræopod, and the whole of the third uropod, are more highly magnified than the rest of the figures, which are all drawn to the same scale.

## PLATE 31.

**A.** *Talorchestia nova-hollandiæ*, n. sp.

Parts of the first and second gnathopods of both male and female, and of the second peræopod, and the whole of the telson, are more highly magnified than the rest of the figures.

**B.** *Hyale Galatæa*, n. sp.

The first gnathopod, the third uropod, and the telson are more highly magnified, as well as drawn to the same scale as the other figures.

**C.** *Hyale diplodactylus*, n. sp.

Parts of the first and second gnathopods of the male, and the second gnathopod of the female, with the whole of the third uropod and the telson, are shown on a higher scale of magnification than that of the figures in general.

**D.** *Hyale macrodactylus*, n. sp.

Parts of the two gnathopods and the second and fifth peræopods are more highly magnified than the complete figures of the same limbs.

## PLATE 32.

**A.** *Hyalella Warmingi*, n. sp.

The antennæ, limbs, uropods, and telson are drawn to the same scale, while more highly magnified figures are given of the mouth-organs, of parts of the first and second gnathopods of the male, and second gnathopod of the female, of the third uropod and the telson. *pl.segm.* 3 shows the side of the third pleon-segment.

**B.** *Hyalella Meinerti*, n. sp.

Both gnathopods of both sexes, and the telson and third uropods, are shown on a higher scale of magnification.

**C.** *Hyale maroubra*, n. sp.

Parts of the two gnathopods, of the second and fifth peræopods, the second and third uropods, and the telson are more highly magnified, and the apical spines of the sixth joint in the peræopods are shown on a still higher, or third, scale of magnification.

## PLATE 33.

**A.** *Allorchestes malleolus*, n. sp.

Parts of the gnathopods of both sexes, the telson of the male in dorsal view, the third uropod and telson of the female in lateral view, are more highly magnified than the parts represented in the other figures.

**B.** *Allorchestes compressus* Dana.

Parts of the first gnathopod of the male, and the first and second gnathopods of the female, are more highly magnified.

C. *Allorchestes plumicornis* (Heller).

Part of the first gnathopod is more highly magnified than the other appendages here figured.

D. *Allorchestes humilis* Dana.

Parts of the two antennæ, of the two gnathopods, the third uropod and the telson, are shown on the higher scale of magnification, on which also the two maxillæ are drawn.

## PLATE 34.

*Iphiplateia Whiteleggei*, n. sp.

The central figure at the top of the plate is the animal in dorsal view. The separated head, antennæ, and appendages of the peræon and pleon are more highly magnified. The minute mouth-organs and the third uropods are magnified on a still higher scale, and some of the details of the mouth-organs are still more enlarged.

## PLATE 35.

A. *Pereionotus Thomsoni*, n. sp.

D., dorsal view of first five peræon-segments, with the third peræopods.

L., lateral view of the same segments.

The separated head and antennæ, the maxillipeds, second maxilla, and appendages of peræon and pleon, are more highly magnified, all on the same scale. Part of the maxillipeds, the second maxilla, the uropods and telson are also given on a higher scale.

B. *Iphilotus Chiltoni*, n. sp.

Part of the maxillipeds is more highly magnified than the other figures. *Ur.* I', 2', 3', and T', are drawn from a different specimen from that which furnished the other figures.

A



B



C

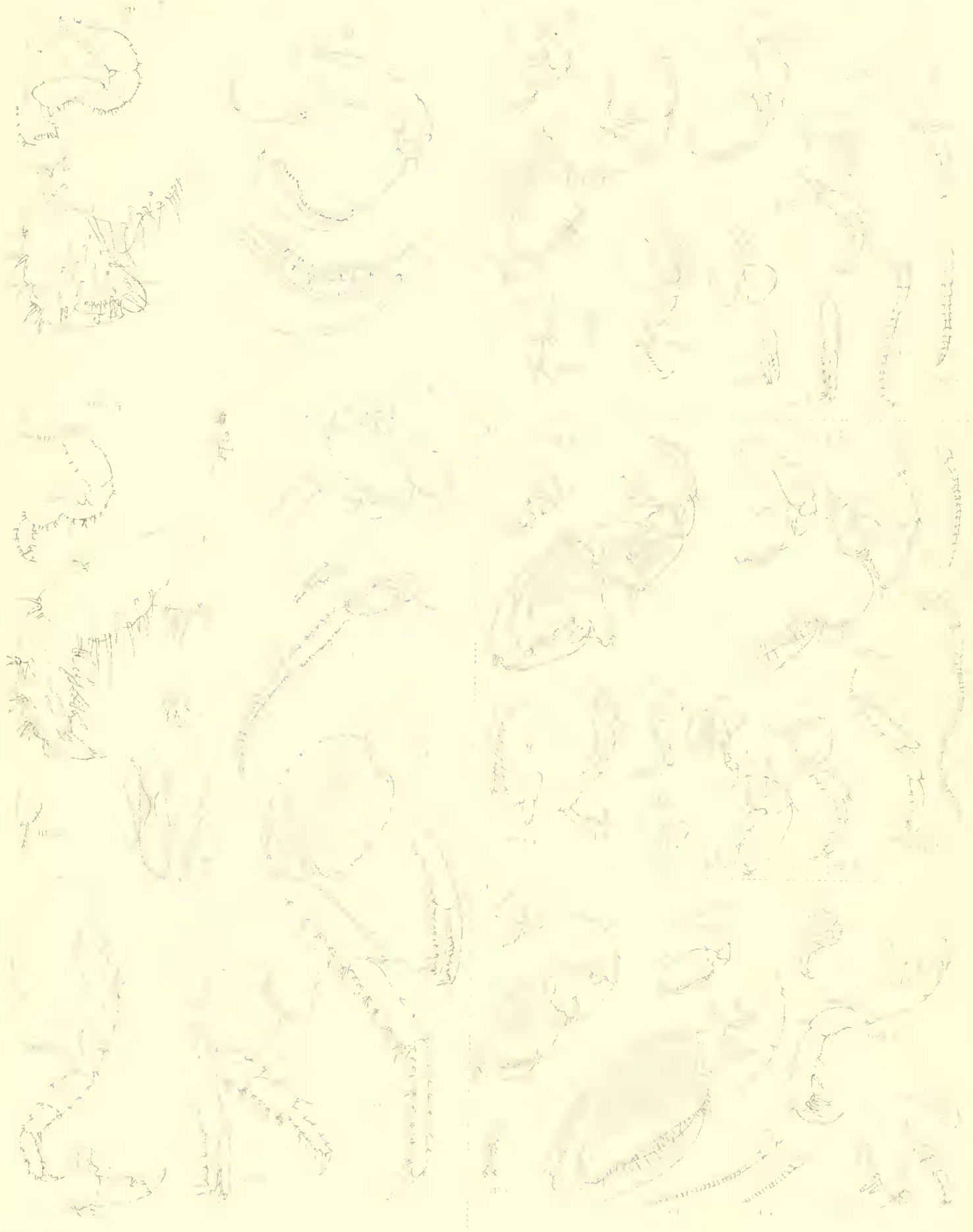


Stebbing

1909

A CARCHESTIA LEWINSKYI ANDOMIN-  
 B CARCHESTIA TRIDENTATA n. sp. CARCHESTIA SULZERI n. sp.

A

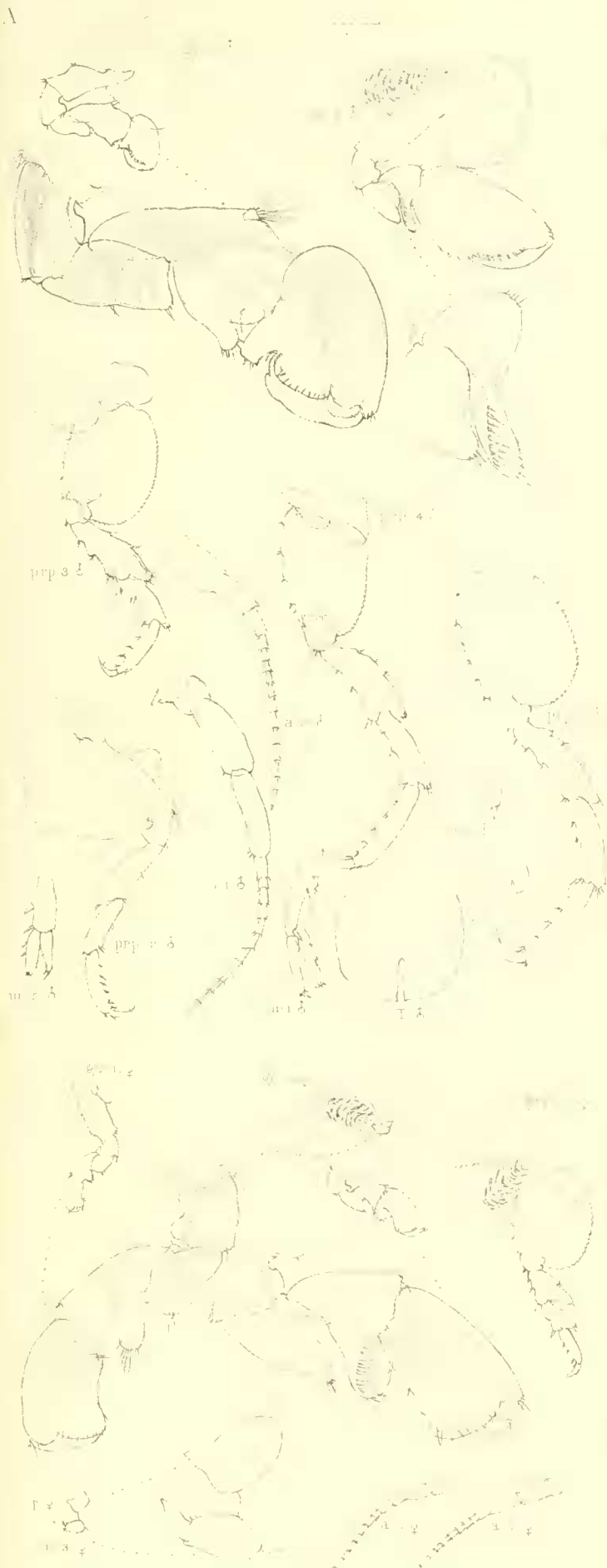


A. TALORCERESIA NOVAE-HOLLANDIAE n. sp.  
 C. HYALE DIPLODASTYLUS n. sp.

B. HYALE DIPLODASTYLUS n. sp.  
 D. HYALE DIPLODASTYLUS n. sp.

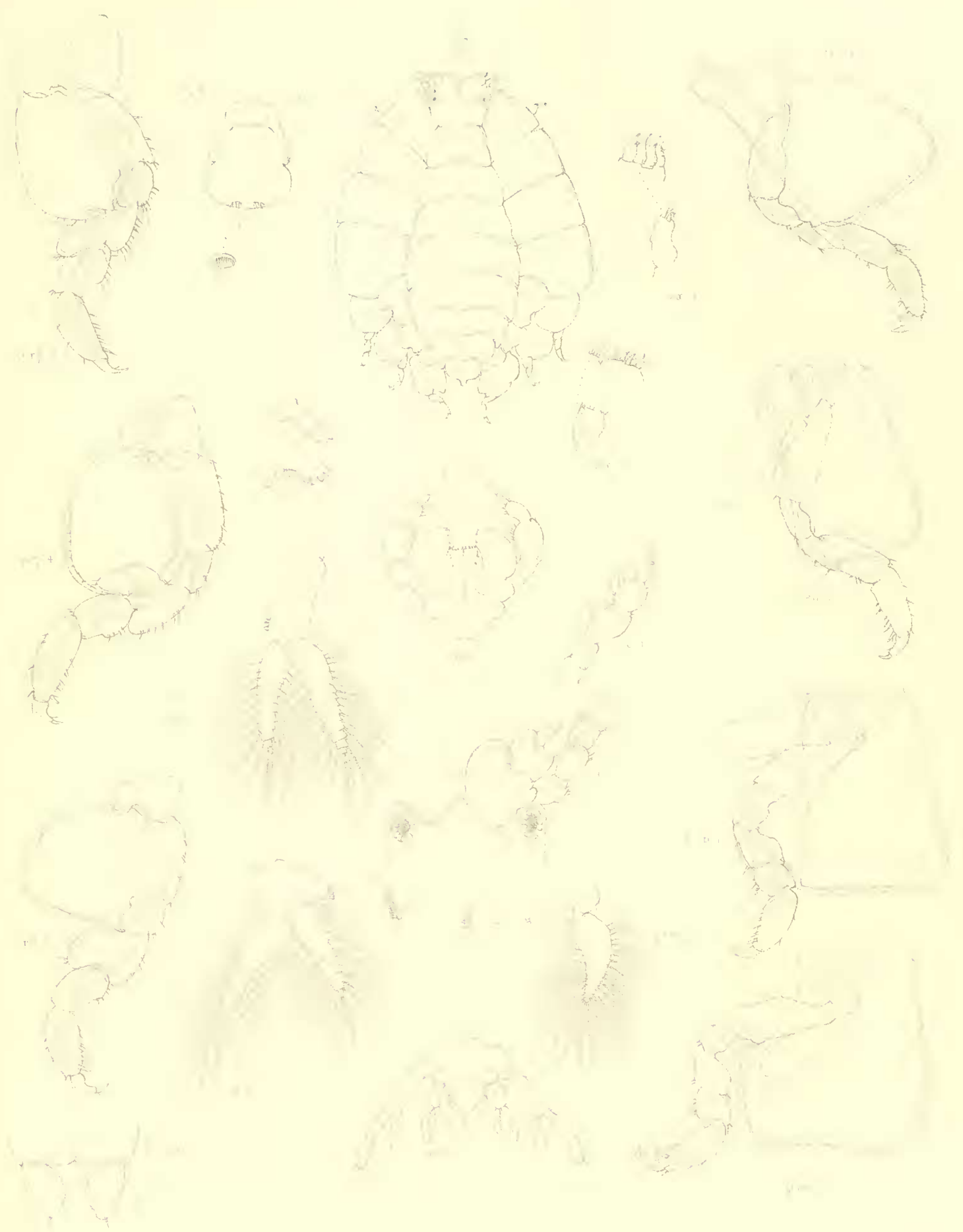




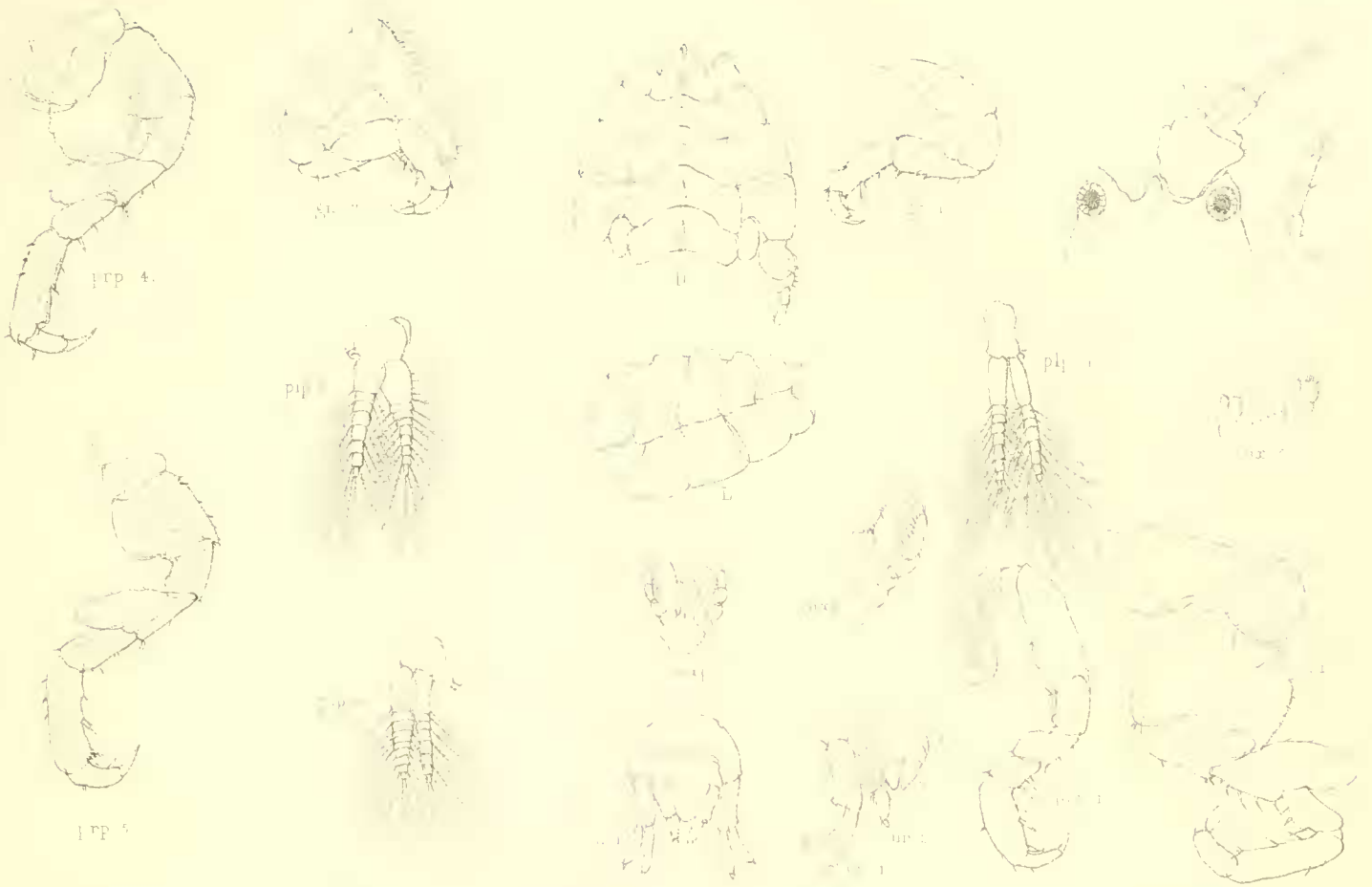


A. *ALLORCHESTES MALLEOLUS* Stebbing  
 C. *ALLORCHESTES PLUMICORNIS* Stebbing

B. *ALLORCHESTES MALLEOLUS* Stebbing  
 D. *ALLORCHESTES MALLEOLUS* Stebbing



A



B

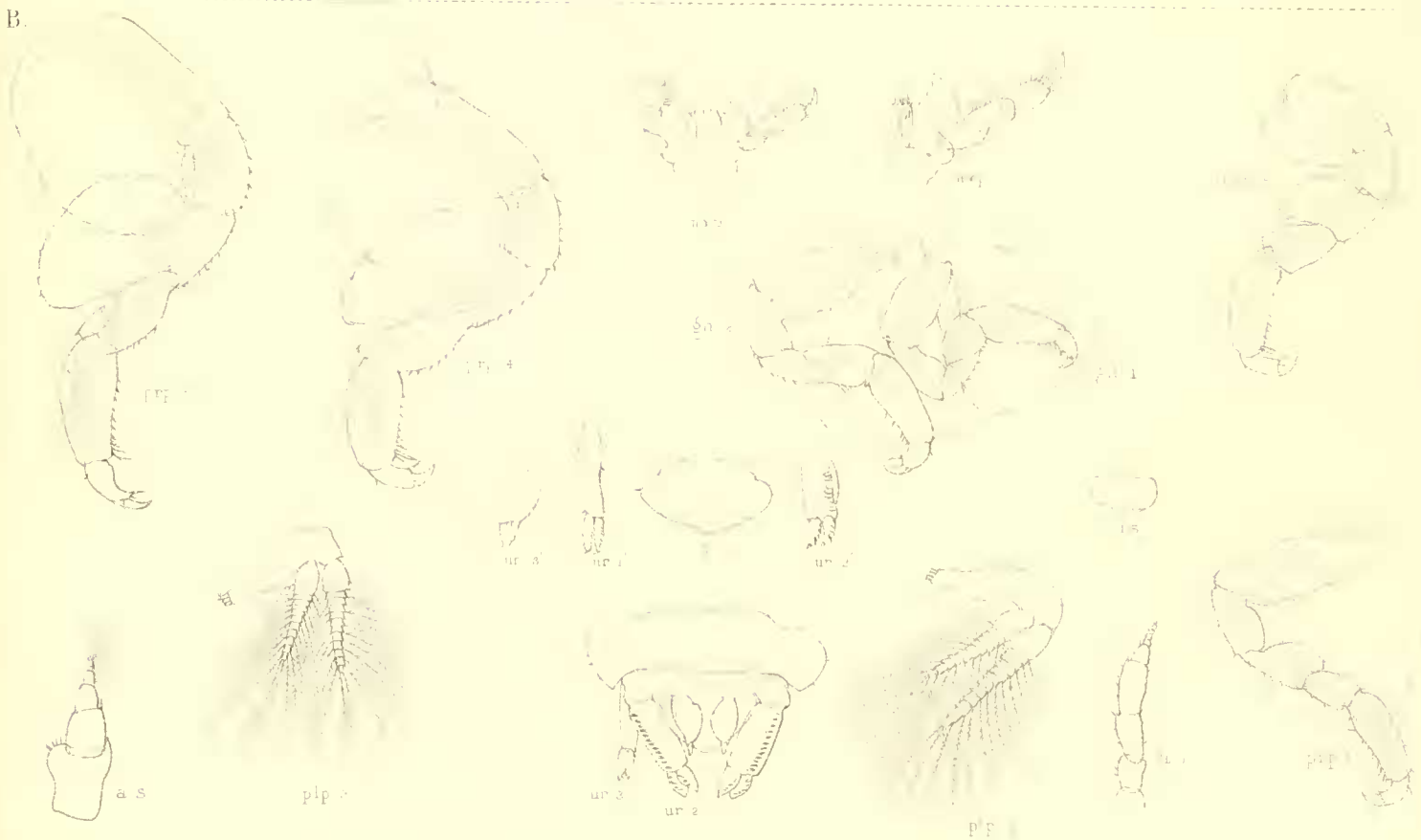


PLATE 35. R. F. STEBBING.

A PERICLIMAXYS THOMSONI n. sp. B IPHINOTUS CHILTCHI n. sp.